

学術論文抄録 2008 年発表

共生ロボットに対するコンパニオン・モデルの形成 ～ホームユビキタス環境における生活実証実験から～

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ヒューマンインタフェース学会 論文誌, 10-1, 21-36 (2007. 2).

本論文では, ホームユビキタス環境における 16 日間の生活実証実験を行った結果について, 人間の認知特性という観点から分析した結果について報告する. 生活実験後の家族に半構造化されたインタビューを実施する方法と, 声認識システムを持っているロボットが自動的に記録した会話ログの分析とを併用した. これらに基づいて認知特性の時間変化を調べた結果から (a) 時間と共にロボットに対する愛着感情が喚起され, 共存者としての認識がおこなわれること, (b) 自分に対するロボットの位置付けについてのメンタルモデルが形成されるということがわかった.

Acute Tobacco Smoke-Induced Airways Inflammation in Spontaneously Hypertensive Rats

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Inhalation Toxicology, 20: 623-633, 2008

Common laboratory rats and mice fail to develop persistent, progressive pulmonary inflammation found in chronic obstructive pulmonary disease as a result of tobacco smoke exposure. We hypothesized that spontaneously hypertensive rats would be more susceptible than normal Wistar Kyoto rats to acute tobacco smoke-induced pulmonary inflammation due to impaired apoptosis. Spontaneously hypertensive rats display systemic oxidative stress, inflammation, hypercoagulation, and immunosuppression, similar to humans with chronic obstructive pulmonary disease. Male spontaneously hypertensive rats and Wistar Kyoto rats were exposed whole-body to tobacco smoke (total particulate concentration 75-85 mg/m³) or filtered air for 6 h/day for 2 or 15 days (3 days/wk). Tobacco smoke caused an increase in bronchoalveolar lavage fluid neutrophils at both time points in each strain. Significantly more neutrophils were noted in spontaneously hypertensive rats at 15 days compared to Wistar Kyoto rats. There was a trend of increase for macrophages in spontaneously hypertensive rats at both time points (significant at 2 days). TUNEL assay detected apoptotic cells in bronchoalveolar lavage fluid and lung tissue sections. The number of apoptotic neutrophils in airway walls and bronchoalveolar lavage fluid increased at 2 days in both strains, but at 15 days the effect was much lower in spontaneously hypertensive rats than in Wistar Kyoto rats. Tobacco smoke induces a greater inflammatory response associated with lower apoptotic neutrophils in the lungs of spontaneously hypertensive rats compared to Wistar Kyoto rats. The spontaneously hypertensive

rat may be a more relevant animal model of acute tobacco smoke-induced airway inflammation than other laboratory rats.

The Time-Dependent Schrödinger Equation: The Need for the Hamiltonian to be Self-Adjoint

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Brazilian Journal of Physics, vol. 38, no. 1, 178–187 (2008. 3).

We present some simple arguments to show that quantum mechanics operators are required to be self-adjoint. We emphasize that the very definition of a self-adjoint operator includes the prescription of a certain domain of the operator. We then use these concepts to revisit the solutions of the time-dependent Schrödinger equation of some well-known simple problems—the infinite square well, the finite square well, and the harmonic oscillator. We show that these elementary illustrations can be enriched by using more general boundary conditions, which are still compatible with self-adjointness. In particular, we show that a puzzling problem associated with the Hydrogen atom in one dimension can be clarified by applying the correct requirements of self-adjointness. We then come to Stone’s theorem, which is the main topic of this paper, and which is shown to relate the usual definitions of a self-adjoint operator to the possibility of constructing well-defined solutions of the time-dependent Schrödinger equation.

Multiphase matching in the Grover algorithm

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Physical Review A **77**, 042324-1–042324-7 (2008. 5).

Phase matching has been studied for the Grover algorithm as a way of enhancing the efficiency of the quantum search. Recently Li and Li found that a particular form of phase matching yields, with a single Grover operation, a success probability greater than 25/27 for finding the equal-amplitude superposition of marked states when the fraction of the marked states stored in a database state is greater than 1/3. Although this single operation eliminates the oscillations of the success probability that occur with multiple Grover operations, the latter oscillations reappear with multiple iterations of Li and Li’s phase matching. In this paper we introduce a multiphase matching subject to a certain matching rule by which we can obtain a multiple Grover operation that with only a few iterations yields a success probability that is almost constant and unity over a wide range of the fraction of marked items. As an example we show that a multiphase operation with six iterations yields a success probability between 99.8 and 100% for a fraction of marked states of 1/10 or larger.

One-dimensional point interaction with three complex parameters

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Journal of Physics A: Math. Theor. **41** 235306–235317 (2008).

For a pair of non-Hermitian Hamiltonian H and its Hermitian adjoint H^\dagger , there are situations in which their eigenfunctions form a biorthogonal system. We illustrate such a situation by means of a one-particle system with a onedimensional point interaction in the form of the Fermi pseudo-potential. The interaction consists of three terms with three strength parameters g_i ($i = 1, 2$ and 3), which are all complex. This complex point interaction is neither Hermitian nor PT-invariant in general. The S-matrix for the transmission-reflection problem constructed with H (or with H^\dagger) in the usual manner is not unitary, but it conforms to the pseudo-unitarity that we define. The pseudounitariness is closely related to the biorthogonality of the eigenfunctions. The eigenvalue spectrum of H with the complex interaction is generally complex but there are cases where the spectrum is real. In such a case H and H^\dagger form a pseudo-Hermitian pair.

Efficient Methods of Blind Deconvolution Based on the Lane-Bates Algorithm: Comprehensive Summary

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京都産業大学先端科学研究所報 , 平成 20 年 7 月 , 19–91 (2008. 7).

We developed efficient methods of blind deconvolution on the basis of the Lane-Bates algorithm. The methods consist of two kinds of mathematical tools and their modified versions. We give a comprehensive summary of them in this report.

Study of the light insulator between scintillator crystals

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京都産業大学先端科学研究所報 , 平成 20 年 7 月 , 93–114 (2008. 7).

In our current project, we undertake an R & D of a new type of PET device which can be produced with a much lower cost yet has a better spatial resolution, compared to the currently used devices. In the course of this development, we encountered a difficulty of light cross-talk between the scintillator crystals. Large amount of effort has been paid to find out the best material to be used to reduce this cross-talk without reducing the light output and the spatial resolution. The experimental result shows that a black flock paper has the most promising features.

静岡県西部の更新世台地上に分布する細粒質土壤母材への アジア大陸北部由来風成塵の影響

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ペドロジスト, 52-1, 2-9 (2008. 6)

静岡県西部の更新世台地（三方原と磐田原）上に分布している細粒質黄褐色森林土をそれぞれ 1 断面調査し，土壤断面性状，理化学性，粘土鉱物組成や微細石英の ESR 信号強度に基づいて風成塵の影響を検討した．その結果，両土壤の主要母材は，アジア大陸北部の先カンブリア界を起源とし，最終氷期最盛期 MIS2 に冬期の北西季節風によって中部山岳地帯を超えて運ばれてきた風成塵であることが示唆された．また，現地性の更新世堆積物の母材への寄与も無視できないこと，少量の始良 Tn 火山灰などのテフラの混入も認められた．

土壤母材としての風成塵中微細石英の起源同定のための 電子スピン共鳴信号強度測定

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ペドロジスト, 52-1, 83-86 (2008. 6)

近年，わが国の台地，丘陵地の土壤は北は北海道から南は沖縄まで，その母材としてアジア大陸由来の風成塵の重要性が注目されてきている．豊田ら（2001）や成瀬ら（1997）は，電子スピン共鳴法（ESR 法）を応用して，風成塵に含まれる微細石英の年代測定法，産地同定法を開発した．本報では，ESR 法の原理の概要を述べ，ついで ESR 測定用の土壤試料調製法を解説し，測定例を示した．

The first homology of the group of equivariant diffeomorphisms and its applications

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Journal of Topology, 1, 461-476 (2008)

Let V be a representation space of a finite group G . We determine the group structure of the first homology of the equivariant diffeomorphism group of V . Then we can apply it to the calculation of the first homology of the corresponding automorphism groups of smooth orbifolds, compact Hausdorff foliations, codimension one or two compact foliations and the locally free S^1 -actions on 3-manifolds.

On the first homology of the groups of foliation preserving diffeomorphisms for foliations with singularities of Morse type

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Publ. RIMS, Kyoto Univ. 44, 1057–1068 (2008)

Let \mathbf{R}^n be an n -dimensional Euclidean space and F_φ be the foliation defined by levels of a Morse function $\varphi: \mathbf{R}^n \rightarrow \mathbf{R}$. We determine the first homology of the identity component of the foliation preserving diffeomorphism group of $(\mathbf{R}^n, F_\varphi)$. Then we can apply it to the calculation of the first homology of the foliation preserving diffeomorphism groups for codimension one compact foliations with singularities of Morse type.

家族横断選択を取り入れた MGG の提案と DS-GA への適用による 解探索性能の向上

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人工知能学会論文誌, 23-6, 526–539 (2008.11).

遺伝的アルゴリズム (GA) で広く用いられる世代交代モデルの一つとして, MGG (Minimal Generation Gap) がある. 従来の MGG は, 単一母集団 GA (sGA) に適用した場合には高い解探索性能を示す. 一方, 複数集団 GA に適用した場合, 解探索性能は必ずしも高くはない.

本論文では, 複数集団 GA に有効な世代交代モデルとして “MGG with global selection (MGG_GS)” を提案する. MGG_GS の特徴は, 世代交代モデルの交叉範囲と選択範囲が異なることである. MGG_GS では, 複数集団ごとに MGG の家族をそれぞれ作成する. 交叉オペレーションは, それぞれの家族内で独立して実行される. 一方, 選択オペレーションは, サブ集団ごとに存在する家族を横断して実行され, サブ集団ごとに個体数が変化する.

本論文では, サブ集団内の個体数の変化に応じて集団構造も動的に変化する複数集団 GA である動的離隔型 GA (Dynamically Separating GA, DS-GA) に MGG_GS を適用し, 提案手法の性質を実験的に明らかにする. DS-GA では, 個体数の増加したサブ集団を複数のサブ集団に動的離隔し, 個体数の減少した複数のサブ集団を結合する.

提案手法と, 従来の MGG を適用した単一母集団 GA や複数集団 GA とを比較した実験結果から, MGG_GS を適用した DS-GA は高い解探索性能を示した. 特に, 多峰性関数や UV 構造を含む関数, だまし関数などに有効であった. また, 実験結果の解析から, MGG_GS は, 従来の複数集団 GA に比べ, サブ集団ごとにそれぞれ異なる領域を探索することで, 局所解にだまされにくいことが示された.

Weber ratio and difference threshold for hardness perception

Koichi NAKAYAMA*, Naomi INOUE

Proceedings of The 11th International Conference on Humans and Computers,
127–132 (2008.11).

We aim to develop a force feedback haptic device for transmitting perception of hardness to bare fingers. In this study, the hardness perception of human fingers is investigated. The experiments show that in order to render the hardness of objects, the acceleration of a haptic device should be $\geq 50 \text{ m/s}^2$, control cycle should be $\leq 40 \text{ ms}$, and Weber ratio of the hardness discriminability should be 0.2–0.4.

gCubik: A Cubic Autostereoscopic Display for Multiuser Interaction

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ACM SIGGRAPH 2008 Poster, 133 (2008. 8).

Collaborative tasks requiring the sharing of an object can benefit from a compact, group-shared autostereoscopic display. We have analyzed the requirements for a cubic autostereoscopic display employing integral photography (IP). The display should be compact as well as graspable and viewable from any direction; thus suitable for group discussions. This paper describes the implementation of the gCubik display that realizes our conceptual prototype. We envision the application areas to include games and edutainment.

Toward and Interactive Box-shaped 3D Display: Study of the Requirements for Wide Field of View

Robert LOPEZ-GULLIVER*, Shunsuke YOSHIDA, Sumio YANO, Naomi INOUE

IEEE Symposium on 3D User Interfaces Symposium, 157–158 (2008. 3).

We propose a graspable box-shaped 3D display as a communication tool that allows multiple users to share and naturally interact with 3D images in face-to-face collaborative tasks. We envision an autostereoscopic 3D display featuring glassesfree and multi-viewpoint operation. Users should be able to view multiple faces in the box-shaped display simultaneously and from any direction. We employ the integral photography (IP) method for this purpose. In this paper, we first analyze the requirements for an IP lens allowing simultaneous multi-face viewing of 3D images in such a display. Consequently, we find that a minimum 120-degree field of view is necessary. Then, we design and prototype an IP lens that provides such a wide field of view. Visual inspection of the generated 3D images confirm the possibility of simultaneous multiple face viewing with the proposed display.

時空間的な局所領域への香り提示手法による覚醒効果に関する一検討

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情報処理学会論文誌, 49-10, 3559-3566 (2008.10).

香りを提示するデバイスの開発が進められてきており, 状況に応じて, インタラクティブに提示することが可能になりつつある. しかし, 前に提示した香りの残留が常に問題になる. 「香りプロジェクタ」では, 時空間的に局所領域へ少量の香りを提示する方法により, 排気設備を利用せずに, 香りの残留を最小限に留めることを可能にした. また断続的に香りを提示することで, 順応や慣れが生じやすい嗅覚に対しても, 香りの心理・生理的效果を持続させることが可能と考えられる. 本論文では, 覚醒効果がある香りを用いて, 香りプロジェクタによる提示方法が, 部屋に香りを充満させる方法よりも, 覚醒効果が持続することを示した.

臨場感を高める香りを画像から推定する手法に関する一検討

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情報処理学会論文誌, 49-12, 3867-3878 (2008.12).

本研究では, 画像の臨場感を高める香りをユーザが容易に選択できるように支援するシステムの構築を目指している. 本論文では, まず画像の臨場感を高める香りを被験者に判定してもらう実験を行った. その結果, その場の香りを同定しにくいと想定した景色を写した画像で, 被験者は画像に含まれる物をもとに, 何らかの香りが臨場感を高めると判定した.

この結果を受けて, 画像に含まれる物を示した言葉から, 臨場感を高める香りを推定できる可能性について検討した. 被験者に, 香りを嗅ぎながら景色等の画像での臨場感の度合いを評価してもらい, さらに, 画像に含まれる物を書き出してもらう実験を行った. 書き出してもらった言葉を分類し, そのカテゴリを説明変数とし, 各香りでの画像に対する臨場感度を目的変数として重回帰分析を行った. その結果, 画像に含まれる物を示した言葉から, 画像の臨場感を高める香りの推定が可能であることが示された.

大阪大学における全学 IT 認証基盤の構築

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情報処理学会論文誌 Vol. 49, No. 3 (20080315) pp. 1249-1264

大阪大学では, 高いセキュリティレベルと標準的なインタフェースを兼ね備えた認証技術として注目されている公開鍵基盤 (PKI: Public Key Infrastructure) に基づく全学 IT 認証基盤を導入した. 本学で導入した全学 IT 認証基盤システムでは, 署名・暗号化, 学内認証, グリッドシステム認証, という異なるポリシーに対応する複数の CA を導入・共存させている. これら複数の CA 向けの証明書発行を自動化することにより, 安全性と利便性を両立した証明書発行サービ

スを実現している．また，PKI に対応したシングルサインオン (SSO) 機能を導入し，学内ユーザが各システム間で統一的なインタフェースにより認証を行えるようにした．アプリケーション Web サーバに認証機能を組み込むエージェント型の SSO 機能の導入により，1 度アプリケーションを SSO 対応させてしまえば，アプリケーションを変更することなくシームレスにパスワード認証から PKI 認証へ移行・共存することが可能となった．さらに，ユーザ ID 体系として，公開用に変更を許容するユーザ ID と，システム間連携用に 1 人に 1 つ決まる不変のユーザ ID とを設け，それらの対応付けを内部的に行うことにより，安全性・柔軟性ある運用を可能とした．本稿では，本認証基盤の設計と実装について述べるとともに，システムの導入により得られた技術的ノウハウや今後の展開についても述べる．

Corticopetal Acetylcholine: Possible Scenarios on the Role for Dynamic Organization of Quasi-Attractors

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M. Ishikawa et al. (Eds.): Neural Information Processing, Lecture Notes in Computer Science 4984, 170-178, (2008), Springer-Verlag.

A new hypothesis on a possible role for the corticopetal acetylcholine (ACh) is provided from a dynamical systems standpoint. The corticopetal ACh helps to transiently organize a global (inter- and intra-cortical) quasi-attractors via gamma range synchrony when it is behaviorally needed as top-down attentions and expectation.

Corticopetal Acetylcholine: A Role in Attentional State Transitions and the Genesis of Quasi-Attractors During Perception

H. Fujii*, K. Aihara, I. Tsuda

R. Wang *et al.* (Eds:), Advances in Cognitive Neurodynamics ICCN 2007, 249-253 (2008), Springer-Verlag.

The Role(s) of corticopetal acetylcholine (ACh) in perception and conscious flow is largely unknown. The attention hypothesis may well be established experimentally. The aim of this talk is to give a small review, and then try to extend further the arguments, on the role of corticopetal ACh in perception from a dynamical systems standpoint, to search for its possible role in perceptual *binding*, and in the transient genesis of quasi-attractors through the mechanism of changing synchrony.

Commutation relations of Hecke operators for Arakawa lifting

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Tohoku Mathematical Journal, 60, 227–251 (2008).

T. Arakawa, in his unpublished note, constructed and studied a theta lifting from elliptic cusp forms to automorphic forms on the quaternion unitary group of signature $(1, q)$. The second named author proved that such a lifting provides bounded (or cuspidal) automorphic forms generating quaternionic discrete series. In this paper, restricting ourselves to the case of $q = 1$, we reformulate Arakawa's theta lifting as a theta correspondence in the adelic setting and determine a commutation relation of Hecke operators satisfied by the lifting. As an application, we show that the theta lift of an elliptic Hecke eigenform is also a Hecke eigenform on the quaternion unitary group. We furthermore study the spinor L-function attached to the theta lift.

Mucin-induced apoptosis of monocyte-derived dendritic cells during maturation

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Proteomics. 8, 3342–3349 (2008. 8)

Many tumors arising from epithelial tissues produce mucins, which readily come into contact with infiltrating cells in cancer tissues. MUC2 mucins were purified from the conditioned medium of a colorectal cancer cell line, LS180 cells. It is known that in cancer patients, the number of dendritic cells (DCs) is reduced and their function is impaired. Mature DCs were generated from human peripheral blood monocytes through successive treatments with GM-CSF and IL-4, and then with proinflammatory mediators. When monocytes were cultured in the presence of MUC2 mucins in addition to GM-CSF and IL-4 at an early stage of development, mature DCs expressing CD83 decreased and apoptotic cells increased in a dose-dependent manner. During the development of DCs, sialic acid-binding Ig-like lectin (Siglec)-3 was constantly expressed. We prepared recombinant soluble Siglec-3 corresponding to the ectodomain of Siglec-3 and confirmed the binding of soluble Siglec-3 to the MUC2 mucins, probably through α 2,6-sialic acid-containing O-glycans including a sialyl Tn antigen, which is known to bind to Siglec-3. Apoptosis was partially inhibited by anti-Siglec-3 mAb or recombinant soluble Siglec-3. These results suggest that apoptosis was partially induced through the ligation of the MUC2 mucins with Siglec-3.

Down-modulation of B cell signal transduction by ligation of mucins to CD22

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Biochemical and Biophysical Research Communications. 372, 45–50 (2008. 7)

Epithelial cancer cells secrete mucins carrying carbohydrate antigens such as a sialyl-Tn antigen into cancer tissues and/or the bloodstream, in which mucins may interact with CD22 (Siglec-2). Mucins isolated from colon cancer cells and bovine submaxillary mucins bound to CD22 cDNA transfectants and a human B cell line, Daudi cell, and the binding of soluble recombinant CD22 to the mucins was confirmed by means of a plate assay. The binding specificity was demonstrated by the fact that the mucins bound to the recombinant CD22 with an intact ectodomain but not to that with a mutated ectodomain. Daudi cells were stimulated with anti-IgM F(ab')₂ in the presence or absence of mucins. Ligation of mucins to CD22 decreased the phosphorylation of CD22 and SHP-1 recruitment, and the phosphorylation of ERK-1/2 prominently. The in vivo effect of mucins on splenic B cells in the tumor-bearing state was investigated using mucin-producing (TA3-Ha) and non-producing (TA3-St) mammary adenocarcinoma-bearing mice. When fluorescence-labeled epiglycanins were administered to normal mice, a portion of them was taken up by the spleen and became associated with splenic B cells. We found that splenic B cells were reduced in TA3-Ha-bearing mice but not in TA3-St-bearing ones. These results suggest that in the tumor-bearing state a portion of the mucins in the bloodstream was taken up by the spleen and ligated to CD22 expressed on splenic B cells, which may have led to down-regulation of signal transduction.

Expression of multiple chondroitin/dermatan sulfotransferases in the neurogenic regions of the embryonic and adult central nervous system implies that complex chondroitin sulfates have a role in neural stem cell maintenance.

Akita K*, von Holst A, Furukawa Y, Mikami T, Sugahara K, Faissner A.

Stem Cells. 26, 798–809 (2008. 3)

Chondroitin/dermatan sulfotransferases (C/D-STs) underlie the synthesis of diverse sulfated structures in chondroitin/dermatan sulfate (CS/DS) chains. Recent reports have suggested that particular sulfated structures on CS/DS polymers are involved in the regulation of neural stem cell proliferation. Here, we examined the gene expression profile of C/D-STs in the neurogenic regions of embryonic and adult mouse central nervous system. Using reverse transcription-polymerase chain reaction analysis, all presently known C/D-STs were detected in the dorsal and ventral telencephalon of the embryonic day 13 (E13) mouse embryo, with the exception of chondroitin 4-O-sulfotransferase (C4ST)-3. In situ hybridization for C4ST-1, dermatan 4-O-sulfotransferase-1, chondroitin 6-O-sulfotransferase (C6ST)-1 and -2, and urono-

syl 2-O-sulfotransferase revealed a cellular expression of these sulfotransferase genes in the embryonic germinal zones of the forebrain. The expression of multiple C/D-STs is maintained on cells residing in the adult neural stem cell niche. Neural stem cells cultured as neurospheres maintained the expression of these enzymes. Consistent with the gene expression pattern of C/D-STs, disaccharide analysis revealed that neurospheres and E13 mouse brain cells synthesized CS/DS chains containing monosulfated, but also significant amounts of disulfated, disaccharide units. Functionally, the inhibition of sulfation with sodium chlorate resulted in a significant, dose-dependent decrease in neurosphere number that could not be rescued by the addition of individual purified glycosaminoglycan (GAG) chains, including heparin. These findings argue against a simple charge-based mechanism of GAG chains in neural stem cell maintenance. The synergistic activities of C/D-STs might allow for the adaptive modification of CS/DS proteoglycans with diversely sulfated CS/DS chains in the extracellular microenvironment that surrounds neural stem cells.

BC_n-type Jackson integral generalized from Gusatafson's C_n-type sun

K. Aomoto*, M. Ito

Journal of Difference Equations and Applications (14, 10 & 11, 1059–1097, October 2008)

A multiple generalization of a very-well-poised-balanced $2r/2r$ basic hypergeometric series is described by using BC_n-type Jackson integrals.

Their structure can be determined by the pairing of symplectic Schur polynomials and n dimensional lattices. As a result of the finite dimensionality of their cohomology, the Jackson integrals satisfy a holonomic system of q -difference equations with respect to the involved parameters. In this note a triangulation of the holonomic system of the q -difference equations is obtained. Based on it, the determinant of matrix formed by the BC_n-type Jackson integrals is evaluated as a product of q -gamma functions and elliptic theta functions.

魯山人生誕地石碑建立における住民合意過程に関する考察

勝矢 淳雄*

環境衛生工学研究 (22 巻, 3 号, 199 頁 ~ 202 頁, 2008. 7)

本論文では、上賀茂に生れた北大路魯山人に生誕地石碑建立における住民と、また住民同士の合意形成について考察した。とくに、魯山人の石碑建立については強硬に反対を蔭でとなえる人がおり、種々の嫌がらせを特定の人たちに行うため、その扱いについてを模索するとともに、その人の心理がどの様なところにあるかをその行動様式から推定した。地元における活動は地元の住民同士の対立の助長を避ける必要があるが、社会的にも理解が得られるだけの出来

うる限りの対応を誠実に行えば、多数の総意のもとに事業を進めることが地元の発展にも必要であることを明らかにした。上賀茂の 1300 年以上の歴史がある中で、農家と社家（賀茂県主同族会）の対立は、旧来の地主と小作人の関係から根強いものが現在にも引き継がれているが、今回上賀茂の歴史始まって以来と考えられるが、連名で石碑建立を行うこととなった。この合意にいたる過程とその問題点と解決の方法、第三者の役割りを考察した。

社家の初詣

勝矢 淳雄*

賀茂文化（5 号，64～72 頁，2008. 4）

本論文は、上賀茂の社家が伝統的に一般とは異なる初詣を行っており、それを現在も引き続き継続して行っている社家の一族があることから、その記録を残す意味からも特別に同道させてもらい、実際に体験した様子を記述している。現在、継続しているのはこの家族および同伴する親族のみ以外には聞かない。この様子と同時に、それぞれの神社の成り立ち、祭神を調べ、この初詣の意義を考察した。

Evaluation Data and Prototype System WISDOM for Information Credibility Analysis

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Internet Research (Vol. 18, No. 2, pp. 155–164, 2008/05)

Evaluation data and a prototype system named WISDOM used for analyzing information credibility based on natural language processing are described. Our group started the Information Credibility Criteria project in April, 2007, mainly to analyze the credibility of information (text) on the Web. The project proposes to capture information credibility based on four criteria (content, sender, appearance, and social valuation) and aims to analyze and organize them logically using natural language processing based on predicate argument structure. The evaluation data described in this paper were developed as learning and verifying data for these various analysis modules and are composed of manually-annotated data based on each evaluation criteria about several pre-selected topics such as current events and medical issues. The prototype system WISDOM was developed to provide information credibility from different perspectives. Users will be able to find credible information more reliably by browsing information using different evaluation criteria and conditions provided by the system.

Spoken Dialog System for Next Generation Knowledge Access

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Proceeding of the 9th International Conference on Mobile Data Management
(MDM2008) (pp. 225–226, 2008/04)

Nowadays we can get most information through the Internet. However, we have a trouble to pick up expected information from the huge results with conventional search engines. Especially in mobile terminal, we are confronted with great difficulties for two factors.

One is that most of users cannot make an appropriate query because their request is vague with themselves. The other is that the retrieved information has huge variation and mobile terminal has small area for displaying them. Therefore, we aim to develop technologies for the users to input their requests by familiar way and clarify what they want to know with displaying the retrieved information with suitable method. This paper shows our development dialog system on Kyoto tourist information assistance in a client-server fashion.

脳内報酬情報処理に及ぼす知覚的曖昧性の影響

山本 愛実・奥田 次郎*・鮫島 和行・坂上 雅道

日本神経回路学会誌, 15-1, 3–17 (2008. 3).

To investigate influence of perceptual saliency on reward processing in the brain, we examined reward-related fMRI activity for random-dot-motion stimuli with different coherence levels. After conditioning delivery of juice reward or control solution with a direction (leftward or rightward) of 100%-coherence random-dot-motion, subjects' brain activity was examined for trials with high and low coherence stimuli. Reward-related activations were found in the caudate head for high coherence trial but in the medial pre-frontal cortex (MPC) for low coherence trial. The results suggest differential involvement of the caudate head and MPC in reward prediction for different saliency stimuli.

未来への予見に携わる脳神経ネットワーク

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玉川大学脳科学研究所紀要, 1, 13–23 (2008. 3).

ヒトは過ぎ去った過去を振り返るだけでなく、来るべき未来のイメージを自由に思い浮かべることができる。このような「予見：prospession」に携わる脳神経機構の研究が近年爆発的に進んでいる。数々の最新の知見を集積すると、prospession は「今現在とは異なる」仮想的な時間や空間、あるいは「自分ではない」他者への「自己投影：self-projection」の1つのかたちであり、脳の内側の前頭葉 側頭葉 頭頂葉ネットワークがこれら自己投影機能に携わる共通の神経基

盤であることが示唆される。本稿では、未来の予見に関わる脳活動についての筆者らの脳画像研究や自己投影に関する他グループの研究を概説し、「現在の知覚入力に応じた即時的な認知処理：stimulus-driven processes」と「即時的な外界環境とは独立な思考過程：stimulus-independent processes」との脳内における組織化について考察する。

Human posterior parietal cortex maintains color, shape and motion in visual short-term memory

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Masamichi SAKAGAMI and Kazuyuki AIHARA

Brain Research, 1213, 91–97 (2008. 6).

We used functional magnetic resonance imaging (fMRI) to investigate the neural substrate of visual short-term memory for objects defined by features processed in the dorsal and the ventral visual streams. Here we adopted the conventional delayed recognition task, whereas in addition to the more commonly used visual features of color and shape, motion direction was applied to define an item. Our behavioral results indicated that the capacity limit of visual short-term memory of motion direction was approximately two, which was significantly lower than those of color and shape, about three or four. We also found that storage capacity was significantly reduced when subjects were required to retain all three features superimposed in space. Meanwhile, fMRI results revealed that activity in the posterior part of the superior parietal lobe was memory-load dependent for all three features indicating that it collects and stores visual information from both the two visual processing streams, whereas the anterior part was load dependent only for motion.

Neural Correlates of true memory, false memory, and deception

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Tetsuya MATSUDA, Etsuro MORI, Minoru TSUKADA and Toshikatsu FUJII

Cerebral Cortex, 18, 2811–2819 (2008.12).

We used functional magnetic resonance imaging (fMRI) to determine whether neural activity can differentiate between true memory, false memory, and deception. Subjects heard a series of semantically related words and were later asked to make a recognition judgment of old words, semantically related nonstudied words (lures for false recognition), and unrelated new words. They were also asked to make a deceptive response to half of the old and unrelated new words. There were 3 main findings. First, consistent with the notion that executive function supports deception, 2 types of deception (pretending to know and pretending not to know) recruited prefrontal activity. Second, consistent with the sensory reactivation hypothesis, the difference between true recognition and false recognition was found in the

left temporoparietal regions probably engaged in the encoding of auditorily presented words. Third, the left prefrontal cortex was activated during pretending to know relative to correct rejection and false recognition, whereas the right anterior hippocampus was activated during false recognition relative to correct rejection and pretending to know. These findings indicate that fMRI can detect the difference in brain activity between deception and false memory despite the fact that subjects respond with “I know” to novel events in both processes.

Marcus contextual languages consisting of primitive words

P. Domosi, *M. Ito and S. Marcus

Discrete Mathematics 308 (2008), 4877–4881

In this paper we prove that the language of all primitive (strongly primitive) words over a nontrivial alphabet can be generated by certain types of Marcus contextual grammars.

Shortest directing words of nondeterministic directable automata

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Discrete Mathematics 308 (2008), 4900–4905

In this paper, we will survey several results on the shortest directing words of various types of nondeterministic directable automata.

Duplication in DNA sequences

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Lecture Notes in Computer Science 5257 (2008), 419–430

Duplication and repeat-deletion are the basic models of errors occurring during DNA replication from the viewpoint of formal languages. During DNA replication, subsequences of a strand of DNA may be copied several times (duplication) or skipped (repeat-deletion). Iterated duplication and repeat-deletion have been well-studied, but little is known about single-step duplication and repeat-deletion. In this paper, we investigate properties of these operations, such as closure properties of language families in the Chomsky hierarchy, language equations involving these operations. We also make progress towards a characterization of regular languages that are generated by duplicating a regular language.

Bounded Hairpin Completion

*M. Ito, P. Leupold and V. Mitrana

Lecture Notes in Computer Science (2009) 掲載決定

In the preceding paper we dealt with the hairpin completion. In this paper we consider a weaker variant of the hairpin completion operation, called the bounded hairpin completion, and try to solve some of problems remained unsolved in the aforementioned paper in this setting.

Notes on Flavor Mixing Matrices Characterized by $SU(2) \times U(1)$ Group Parameters

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Progress of Theoretical Physics, Vol. 119, No. 2, pp. 339–344 (2008.2)

A flavor mixing matrix (FMM) characterized uniquely by four group parameters of the $SU(2) \times U(1)$ symmetry is applied to the investigation of experimental results for the lepton and quark sectors. Neutrino oscillation data are analyzed by assuming that the 1–3 component of the lepton FMM vanishes. With this assumption, the lepton FMM is expressed in terms of analytic functions depending effectively on two group parameters. It is confirmed that, while all group parameters of the lepton FMM have values of approximately the same order of magnitude, those of the quark FMM have very different values with hierarchical structures. We make a conjecture concerning the behavior of the lepton FMM with a small but non-vanishing 1–3 component.

Optimization of the Marker-based Procedures for Pyramiding Genes from Multiple Donor Lines: III. Multiple-gene assemblage using background marker selection

T. Ishii, T. Hayashi, and K. Yonezawa*

Crop Science 48: 2123–2131 (2008).

Constructing high-degree gene-pyramided lines has important practical implications; such lines could be used for multiple purposes, for example, as a high-powered breeding stock line, a material line for characterizing multigene interactions, or a market variety as it stands. Effectiveness of two typical marker-based schemes for constructing such lines, named AF (gene assemblage first) and BF (backcross first), is discussed. In AF, target genes of all donor parents are assembled onto the genome of a plant first, followed by backcross generations for the recovery of recipient parent genome. In BF, backcross is performed first

separately for each donor, followed by generations of crossing for the assemblage of target genes. Our stochastic calculations show that BF is superior to AF when molecular selection is used for both target genes and background markers; with the same number of generations (time) and cost of genotyping, BF produces a much higher recovery of recurrent parent genome than AF. The superiority of BF weakens somewhat when target genes are selected by phenotype; AF is superior when assembling three or more unlinked target genes, or could be a choice of the breeder when assembling three or more linked genes. Otherwise, BF is superior. To minimize cost, genotyping and selection for background markers should be performed stepwise in each generation, that is, in three or four stages starting from markers closely linked with target genes to unlinked ones.

RFID を用いた浴室内行動計測の基礎検討

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情報処理学会論文誌, Vol. 49, No. 6, pp. 1932–1941 (2008)

浴室は毎日利用するスペースで健康管理やリラクゼーション応用が期待できるほか、入浴事故を防ぐための安心・安全の機能が求められるスペースでもある。我々は、このような様々な用途へ応用可能なユビキタス環境の実現に対し、浴室を対象として研究を行っており、これまでに浴槽を中心としたシステムを扱ってきた。本研究では浴槽外もユビキタス環境として実現するために RFID を用いて入浴者の行動計測を行う手法について提案する。これは、RFID が取り付けられた浴室内の物品の位置を浴室外から計測することで、入浴者が使用したものを計測するものである。本論文では、浴室での RFID 利用に関する基礎実験のほか、物品使用時間に関する被験者実験の結果を踏まえ、提案手法の可用性について考察と検討を行った。その結果、13.56 MHz 帯のアンチコリジョン機能付き RFID であれば基本的に利用可能であることが確認できた。しかし、物品の種別や人による使用方法の違いなど、幾つかの課題についても確認できた。

鳥インフルエンザ研究センター 2008 年業績

A vaccine prepared from a non-pathogenic H7N7 virus isolated from natural reservoir conferred protective immunity against the challenge with lethal dose of highly pathogenic avian influenza virus in chickens

Sakabe S, Sakoda Y, Haraguchi Y, Isoda N, Soda K, Takakuwa H*, Saijo K, Sawata A, Kume K, Hagiwara J, Tuchiya K, Lin Z, Sakamoto R, Imamura T, Sasaki T, Kokumai N, Kawaoka Y, Kida H.

Vaccine, 26-17, 2127–2134 (2008. 4).

During 2001–2004, 41 H7 influenza viruses (2 H7N1 and 39 H7N7 strains) were isolated from fecal samples of migratory ducks that flew from Siberia in the autumn of each year to Japan and Mongolia. A phylogenetic analysis of the hemagglutinin (HA) genes of the nine representative isolates revealed that they belonged to the Eurasian lineage and the deduced amino acid sequence at the cleavage site of the HAs represented apathogenic profiles. One of the H7 isolates A/duck/Mongolia/736/02 (H7N7) was chosen from these H7 isolates for the preparation of the test vaccine. To improve the growth potential of A/duck/Mongolia/736/02 (H7N7) in chicken embryos, A/duck/Hokkaido/Vac-2/04 (H7N7) was generated by genetic reassortment between A/duck/Mongolia/736/02 (H7N7) as the donor of the PB2, PB1, PA, HA, NA, and NS genes and A/duck/Hokkaido/49/98 (H9N2) as that of NP and M genes. The test vaccine was prepared as follows; A/duck/Hokkaido/Vac-2/04 (H7N7) was propagated in chicken embryos and the virus in the allantoic fluid was inactivated and adjuvanted to form an oil-in-water emulsion. The test vaccine conferred immunity to chickens, completely protecting the manifestation of clinical signs against the challenge with lethal dose of H7 highly pathogenic avian influenza virus. These results indicate that influenza viruses isolated from natural reservoirs are useful for vaccine strains.

鳥インフルエンザとは

大槻 公一

成人病と生活習慣病, Vol. 38, No. 11, 1244–1250 (2008)

1. 鳥インフルエンザには鶏に対して致死性の高い疾病と不顕性感染を主体とする疾病がある。2. 鳥インフルエンザウイルスは本来水鳥に保有されており, その大部分は鳥類に対して強い病原性を示さない。3. H5 と H7 亜型ウイルスのみが鶏に対して強い病原性を獲得する。4. 世界で多くの国に強毒の H5N1 亜型ウイルスが家きん類に大きな被害を与えている。5. 日本国内でも 2004 年に 79 年ぶりに高病原性鳥インフルエンザが発生した。6. それ以降 2007 年, 2008 年にも発生が起きている。世界に広く蔓延している鳥インフルエンザウイルスが新型インフルエンザの原因ウイルスに深く関連することが心配されている。

最も危険な外来性の鳥由来人獣共通感染症 鳥インフルエンザ

大槻 公一・高桑 弘樹・常國 良太・中井 雅晶

京都産業大学先端科学技術研究所報, 第 7 号, 161–176 (2008)

2004 年 1 月に山口県, 大分県, 京都府で高病原性鳥インフルエンザは 79 年ぶりに発生した。その際に上記技術マニュアルは鳥インフルエンザ発生養鶏場における原因ウイルスの封じ込めを実施した際に有効に機能した。しかし, 改善すべき不備な点のあることも同時に明らかとなった。

この 2, 3 年日本国内ばかりでなく世界各地における鳥インフルエンザが続発している。鳥インフルエンザ浸潤状況も拡大方向にあるが, めまぐるしく変化している。そのため, 過去に起きた発生事例がすぐに忘れ去られてしまう傾向にある。鳥インフルエンザ発生は, 事例ごとに発生原因あるいは発生様式の異なる事が多い。したがって, 過去に起きた発生事例の要点

を記録しておく事が重要となる．本稿では，上記の点を留意して，少し古い鳥インフルエンザ発生事例を中心に論及した．

Surveillance of Avian Influenza Virus in Vietnam

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Proceedings of the Asian Research Forum on Emerging and Reemerging Infections,
2008, Osaka 28th–29th January 2008

The Avian Zoonoses Research Centre consisting of three laboratories was established in the Faculty of Agriculture, Tottori University in April 2005. Avian Influenza Research Centre was established in Kyoto Sangyo University in December 2006. Academic exchange agreement between Tottori University and Kyoto Sangyo University was concluded on 12th November 2007 to progress their epizootiological and epidemiological studies of avian influenza in Vietnam.

The aim of the surveillance in 2006 was to investigate the possibilities whether avian influenza viruses are still shedding in poultry farms after the vaccination was started and whether free-living birds in their surrounding areas are carrying virulent avian influenza viruses including H5N1 subtype. Furthermore, the isolated influenza viruses are analysed their characteristics. Many chicken and duck flocks are estimated vaccination effect by calculating their serum antibody titres to H5 virus. We expected that this surveillance would predict re-outbreak and/or new outbreaks of influenza virus infection in Vietnam.

We chose apparently healthy 40 poultry farms in each of 3 provinces near Ha Noi and their surrounding areas (total 120 farms). In each farm, 20 each of tracheal and cloacal swabs for viral isolation were taken (total 1,200 each of chickens and ducks) and 20 sera were taken for serological test in each farm (total 2400 sera). In each surrounding areas, tracheal and cloacal swabs and sera were taken from the free-living birds. Tracheal and cloacal samples were inoculated into 10-day-old embryonated eggs. Serum samples were investigated by both agar gel immunodiffusion and haemagglutination-inhibition tests to detect antibody to avian influenza virus.

Antibody to H5N1 subtype influenza virus was detected in many duck flocks even in non-vaccinated flocks; antibody titres was not necessarily related to vaccination, that is, in some vaccinated duck farms number of antibody having ducks was limited and their antibody titre was rather low. Antibody-having chicken flocks were limited. No H5N1 influenza virus was isolated from any chicken or duck samples.

Although between October 2005 and March 2007 no prevalence of highly pathogenic avian influenza occurred in Vietnamese poultry industry, H5N1 influenza virus seemed to occur silent epizootic in this industry.

Epizootiology of Avian Influenza

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Proceedings of the International Symposium on Environmental Change, Pathogens,
and Human Linkages, Research Institute for Humanity and Nature in Kyoto,
11th–14th June 2008

Avian influenza is one of the most important zoonoses. Highly pathogenic avian influenza (HPAI) viruses subtype H5N1 continue to circulate and cause disease not only in free-living birds but also in domestic ones throughout Asia, Europe and Africa.

Free-living water fowls are considered the reservoir of all influenza A viruses. They are known to carry various subtypes of viruses including H5 and H7, but usually in the low pathogenic form. Considerable circumstantial evidence suggests that migratory birds can introduce low pathogenic H5 and H7 viruses to poultry flocks, which then mutate to the highly pathogenic form. Actually an avirulent H5N3 isolate from whistling swan became highly pathogenic after 24 consecutive passages through air sacs, followed by five passages in chick brain (Ito *et al.* 2001). This achievement proves clearly that highly pathogenic avian influenza viruses could arise from avirulent strains maintained in wild waterfowl. Origin of the present H5N1 influenza viruses is also thought to be an avirulent one harboured in some water fowl.

Avian influenza virus H5N1 subtype has been shown to transmit to humans and led to the fatal sporadic outbreak and has become threat to the public health.