Document Watermark Technology

Kristin Dana;
- Rutgers University Associate Professor, Department of Electrical and Computer Engineering
- Ph.D. from Columbia University in 1999
- Background: surface science for vision and graphics

Document watermark technology that protects documents from fraudulence based on two separate, but integrated innovations: 1) an optically encoded reflectance watermark pattern and 2) a component which allows for simultaneous observation of the watermark across a range of viewing angles. These watermarks are not reproducible, secure, and estimated potential market in passport and driver licensing alone is estimated at $28.4M annually.

Integrated Passive Optical Network Light Source

Richard (Rik) Riman;
- Rutgers University Professor II, Department of Materials Science and Eng.
- Inventor of rare-earth nanocomposite technology polymer optical materials
- Over 10 patents issues in materials processing, about 10 pending
- Over 150 publications, over 400 presentations (about 1/2 invited)
- Fellow of the American Ceramic Society

Integrated light source for use in Passive Optical Networks (PON) with introduction of Wavelength Division Multiplexing (WDM) technology into FTTH (fiber to the home) access systems for increased communication network capacity. The innovation integrates a patented low cost Rutgers rare-earth nanocomposite emitter technology as part of the device and provides a low-cost, scalable, critical component to an otherwise COTS system, estimated to serve a market of $40M by 2010.

Facial feature Tracking System

Dimitris Metaxas;
- Rutgers University Professor II
- Holds 4 patents, over 300 publications
- Known worldwide for research in imaging area; pioneered many methods used.
- Began NewCo at UPenn and has experience in small startups.
- Over $1.5M per year in research funding

Real time system to detect driver drowsiness with facial feature tracking based upon; 1) accurate eye blink detection and 2) accurate head pose prediction for recognizing "nodding off" while at wheel from fatigue or sleepiness. Other applications include gross head movement analysis of subjects during interrogation for deception and nervousness detection. The innovation(s) work in real time and under natural illumination conditions with markets of interest such as the multi billion dollar automobile industry for rectification of driver fatigue and post 9/11 market need for security /surveillance behavior analysis, iris scanning and face recognition.

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Nanowires on Flexible Substrates

Eric (Rick) Garfunkel;
- Rutgers University Professor of Chemistry and Physics
- Associate Director of Rutgers Institute for Advanced Materials Devices and Nanotechnology

A method to grow semiconducting nanowires (NWs) on a flexible, transparent substrate with potential application to flexible electronics for electronic paper, smart clothing, flexible displays, flexible solar panels, photovoltaics, and sensors as well as application to existing electronics and transistors. Nanowires are grown directly and efficiently resulting in low cost, secure attachment of the wires to the substrate and innate flexibility. Market projections estimate an initial market of $3.2B globally with explosive growth of $250B over the next 10-15 years.

Mercury-Free Germicidal Lamp

Daniel Murnick;
- Ph.D., Rutgers University Professor of Physics
- Worked on the basic physics of UV technology for several years
- Serves as the Chairman of the Board of UV Solutions Inc.

The innovation is a UV lamp technology with application to air and water treatment (germicidal disinfection), LCD & semiconductor manufacturing and medical therapeutics. Light sources are mercury free, energy efficient, and can be configured in a wide range of shapes. The technology is safe, and recyclable and potential applications include drinking water, food processing, medical and industrial applications. Market size (industrial, residential, agricultural), for the water purification industry was calculated at $460B in 2006 with an expected growth rate of 3.8% annually.

TrafficView and Other Vehicular Networking Applications

Liviu Iftode;
- Rutgers University Associate Professor of Computer Science
- Ph.D. in Computer Science, Princeton, 1998

TrafficView relies upon car-to-car communication and data aggregation to show a driver the traffic ahead - in real time. The vehicular system consists of an embedded computing system, Vehicular Information Transfer Protocol (VITP) for traffic queries and probabilistic data aggregation validation for information security. Where existing traffic information systems are centralized and work on relatively large road and time granularity, this innovation provides for mobile, decentralized, systems that can accommodate applications such as Active Highways (use of reservations on dedicated lanes for congestion-free traffic) and "social networking on the road" (information exchange between frequent commuters with similar travel schedules). This innovation is essentially infrastructure-free and boasts a potential market of $6.5B in 2008 for the US Telematics market overall.

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Robotic Ankle Therapy

Grigore (Greg) Burdea;
- Founder of the Virtual Rehabilitation series of conferences
- Associate Editor - IEEE Transactions on Neural Systems and Rehabilitation Eng
- Author of VR textbook used at 100 universities
- Recognized expert on haptics (force and touch feedback for VR)

A small robot used for therapy of the ankle, which measures foot position and orientation, resists movement under computer control and trains ankle strength, coordination, and endurance with fine control of ankle torques, coordination and range in six degrees of freedom. Use of the robot has patients seated and exercising while interacting with a virtual reality simulation and response data is stored transparently in a database while performance is graphed, and exercise difficulty is set, remotely. Current walking rehabilitation systems require the patient to stand during therapy adding space and expense. Clinical studies for this innovation have been received well and we look forward to a current market estimated at $30M to $40M.

Paint Resin Reclamation for Use in Thermoplastics

Tom Nosker;
- Ph.D. in Mechanics and Material Science
- Holds 8 patents in the area of polymer materials and plastic recycling
- Developed the process for manufacturing plastic lumber from recycled plastic bottles

Process for blending unwanted latex paint with recycled plastics resulting in an increase in the available plastics, reduction in the management cost of recycling latex paint, ($8.59 per gallon), reduction in the depletion of our natural resources and creation of a lower cost/high performance engineering plastic. World-wide there is a demand to find alternative solutions to dealing with post-consumer latex paint rather than the current practice of land filling; and plastics are especially expensive now, therefore timing is ripe for this technology introduction. Based upon 2005 recycled HDPE rates, 588M lbs. of thermoplastic polymer resin pellets could per produced each year with a profit generated of approx. $26M per year domestically (global estimates N/A, presumed higher).