STEP Fund

Portfolio

NOTE: these are projects' abstracts, full projects are only available in the STEP Fund members section; more info can be obtained upon apposite request contact@stepfundfoundation.com

A.

Electrical Engineering Group, R&D
Software Engineering Group, R&D

Inexpensive Vision & Sensor Nets for body motion, posture and facial gesture recognition

Our goal is to develop a flexible human computer interface (HCI) based on low-cost vision systems and wearable sensor nets. This system will use mass-produced off-the-shelf sensing devices such as data gloves and wireless webcams to communicate with a commercially available PC compatible VR card. We will program this card to do considerable signal analysis and interpretation, and then communicate the results in real-time through a very low bandwidth stream for further use.

Keywords: human computer interface, vision system, surveillance, wearable sensor net, data gloves, virtual reality (VR), sensor fusion VR card, games, autistic kids' interfaces, sign-language interfaces, home entertainment, education, rehabilitation and physical therapy, ordinary practice or special training, synthetic character drivers, tele-presence.

This proposal was originally brought to STEP Fund by (in alphabetical order) D. Demirdjian, R. Kaliouby, N. Mavridis and M. Popovic.
(July 2007)

Status: Initial Due Diligence

B.

Mechanical Engineering Group, R&D and Manufacturing

An economical Exercise and/or Virtual Reality platform for full 360° horizontal maneuverability

We envision a new generation of ground platforms for multidirectional walking and running. Our prototype device will be used as an exercise/rehabilitation appliance and will be integrated into a virtual reality home entertainment center as its floor (see Proposal A).

Keywords: ground platform, multidirectional walking and running, virtual reality, games, home entertainment center, exercise machine, physical therapy/rehabilitation appliance.

This proposal was originally brought to STEP Fund by M. Popovic.
(July 2007)

Status: Initial Due Diligence

C.

Software Engineering Group, R&D
Electrical Engineering Group, R&D and Manufacturing

i*Guide* -- hand-held tourist guide

We envision a portable, hand-held device – the iGuide -- that provides an unprecedented range of interactive services to the 21st century traveler. The multilingual, interactive iGuide can passively offer a wide variety of "on demand" services or -- if instructed to -- can actively operate as a semi-autonomous "buddy" to the tourist based on its knowledge of his inclinations, desires, and intentions. The iGuide can work in isolation with the human traveler or serve as the gatekeeper to a wide range of social networking opportunities.

Keywords: portable hand-held device, wireless, tourist guide, artificial intelligence, databases, global positioning system (GPS) or triangulation system, real & virtual tourists.

This proposal was originally brought to STEP Fund by M. Popovic.
(July 2007)

Status: Initial Due Diligence

D.

Software Engineering Group, R&D
Electrical Engineering Group, R&D and Manufacturing
Mechanical Engineering Group, R&D and Manufacturing

i*Knock&Talk* Galleria Club

The iNock&Talk Galleria is a series of "windows on the world" -- an aesthetically pleasing array of specially-equipped flat-panel video screens, speakers, microphones and cameras sited as art installations for social networking. The central goal of the iNock&Talk Galleria is to connect people across the globe in spontaneous but engaging multimedia communications.

Keywords: multimedia telecommunication portals, 2-way teleconferencing, flat panel displays, microphones, cameras, pressure sensors, accelerometers, network club, public art installations, dating & social networking, entertainment industry, business communications & consulting, institutional collaboration, research & scholarly exchange.

This proposal was originally brought to STEP Fund by M. Popovic.
(July 2007)

Status: Initial Due Diligence

E.

Mechanical Engineering Group, R&D and Manufacturing
Electrical Engineering Group, R&D and Manufacturing
Software Engineering Group, R&D

The 2-wheeled Chariot (medical wheelchair + kinetic chair)

We will expand on the technology of the Segway "personal transport" platform to create a new form of motorized "wheelchair" that easily mounts street curbs and smoothly travels over rough terrains. We anticipate that the resulting vehicle will be popular not only with the disabled, but also with the fully abled public.

Keywords: 2-wheeled mobile platform, personal transportation, motorized wheelchair, third world countries, segway, kinetic chair, telescoping legs, shock absorbers, pressure sensors, strain gauges, rough terrain, all-terrain robots.

This proposal was originally brought to STEP Fund by (in alphabetical order) Hugh Herr and M. Popovic.
(July 2007)

Status: Initial Due Diligence

F.

Software Engineering Group, R&D
Electrical Engineering Group, R&D

Online elderly care

This project will develop an on-line care service for the elderly. Each patient's house will be equipped with a personal computer, a DSL line, and wireless IP cameras in every room that transmits 24 hours a day, seven days a week. Special software will constantly track the movements and activities of the patient in real-time and immediately alert our staff if something seems wrong. In addition, the patient will be equipped with a wearable wireless "emergency button" that they can press to immediately summon aid.

Keywords: on-line elderly care, DSL cameras, surveillance, privacy, body contours software, "emergency button", outsourcing, videoconferencing, medical report, home health care, prison health care, business & industrial security.

This proposal was originally brought to STEP Fund by (in alphabetical order) N. Mavridis and M. Popovic.
(July 2007)

Status: Initial Due Diligence

G.

Software Engineering Group, R&D
Electrical Engineering Group, R&D and Manufacturing

Low-cost IP set-top boxes (STB)

The goal of this project is to develop a low-cost Internet-connected "set-top box" that serves as a flexible, reconfigurable hub for all household multimedia needs: television, radio, telephones, e-mail, Web browsing, multiplayer gaming, etc. Our initial implementation will focus on the South Eastern European (Serbia, Montenegro, Bosnia, etc) Cable Service Provider market, but can easily expand to other markets and other Internet Service Providers. Every home and business is a potential customer.

Keywords: inexpensive internet connected set-top boxes, MPEG 2 / MPEG 4 IP and/or DVB-C, conditional access system, middleware, multimedia, cable service provider market, South Eastern Europe, email, internet, VoIP, fan-less single board PC, HD audio & video output, fast Intel processor.

This proposal was originally brought to STEP Fund by (in alphabetical order) M. Popovic and M. Radulovic.
(June 2007)

Status: Initial Due Diligence

H.

Mechanical Engineering Group, Manufacturing
Software Engineering Group, Manufacturing

High-Performance Aluminum Parts Design & Manufacturing Studio

Our goal is to develop an aluminum extrusions design and manufacturing studio that will become a brand name in the South Eastern Europe. While there is substantial potential for high return on investment this project has no predetermined technological novelty.

Keywords: metal fabrication, aluminum extrusion, design and manufacturing, rails, casings, tubes, housings, blocks, South Eastern Europe.

This proposal was originally brought to STEP Fund by (in alphabetical order) M. Popovic and N. Vukovic.
(June 2007)

Status: Initial Due Diligence

I.

Mechanical Engineering Group, R&D and Manufacturing
Electrical Engineering Group, R&D and Manufacturing
Software Engineering Group, R&D

Inexpensive “neuro-controlled” Leg Prosthesis & Orthosis for the third world countries

The goal of this project is to develop inexpensive “neuro-controlled” ankle-foot prosthesis and “neuro-controlled” inexpensive ankle-foot orthosis. Muscle action potential, generated in the residual limb or elsewhere by thought or reflex, will be indirectly measured via electromyographic (EMG) signal. Non-invasive EMG probes will be compactly embedded to the prosthetic socket or attached to the user’s clothing. Adaptive on board control system will integrate EMG signal with other sensory signals and “decide” on the next optimal action. Hereafter the target selling price defining wording “inexpensive” is $1.5k USD (10-30 times lower price than what is currently available or will be soon available on the global market) . Our initial implementation will focus on the Central and Eastern European market and also market in India, but can easily expand to other third world countries.

Keywords: inexpensive leg prosthesis, inexpensive leg orthosis, “neuro-control”, electromyographic (EMG) signal, non-invasive, adaptive control, wearable sensors, socket, Central & Easter European market, Indian market, third world countries, user muscle stiffness, home entertainment and gaming industry.

This proposal was originally brought to STEP Fund by (in alphabetical order) Glorianna Davenpot, Bhargav Gajjar, Hugh Herr and M. Popovic.
(August 2007)

Status: Initial Due Diligence

J.

Mechanical Engineering Group, R&D and Manufacturing
Electrical Engineering Group, R&D and Manufacturing
Software Engineering Group, R&D

Satellite stabilization system via gravity gradient boom and interferometric photon pressure system

The goal of this project is to develop angular and radial stabilization systems for an emerging class of small, light and relatively inexpensive geostationary satellites. The system will utilize three main technologies: photovoltaics, mem's based interferometric photon pressure modulation, and micro-actuated mechanical boom leveraging.

Keywords: small satellites, angular and radial stabilization, photovoltaics, mem's based interferometric photon pressure modulation, micro-actuation, gravity gradient boom, space exploration, astrophysics, surveillance, telecommunication, education.

This proposal was originally brought to STEP Fund by (in alphabetical order) Bhargav Gajjar, M. Popovic and Daniel E Smalley.
(September 2007)

Status: Initial Due Diligence

K.

Software Engineering Group, R&D

Face verification system

This project will develop an secured on-line service for the face verification. Visual input from the webcams or similar devices tagged with a name and/or identification number of person being verified (person in question may be accessing secured online site or entering limited access physical site, using ATM or making purchase with a credit card at a local store) will be sent via secure encrypted connection to our database. Using several advanced techniques we will compare currently obtained data with all the previous data from the same person. Result of this analysis will be probability (statistically verified in the experiment) that person is not the same one as suggested by his/her name/id #.

Keywords: on-line service, face verification, surveillance, security, database.

This proposal was originally brought to STEP Fund by (in alphabetical order) Jay Best, Lalit Jain and M. Popovic.
(September 2007)

Status: Initial Due Diligence

L.

Software Engineering Group, R&D

IT for the Forex, CFD and Futures Industries

In partnership with Boston Trade Technologies LLC @ Boston Exchange we will provide technology solutions, business advice, and trading assistance for the Forex, CFD and Futures Industries; from JAVA/C++ built bridges to reporting tools via web interfaces and futures trading. Till now BTT specialized in the after market products for MetaTrader 4 (MT4) platform which meets high standard of business performance by over 100 brokerage companies and banks worldwide. The BTT bridges enable the MT4 platform to receive quotes and to select which orders will be sent to one of the primary brokers and which will be kept in house. As decided by the MT4 manager, client may receives quotes from one bank and send deal request to another bank. The bridges are built in Java and provide full logs of all the transactions. For the security purposes the communications are encrypted via a VPN or a certificate protected connection. However, BTT plans to expand and in partnership with BTT we will be working on consolidating the world market in foreign exchange by interconnecting ALL the platforms.

Keywords: on-line service, IT for financial industry, web interface, banks, dealers, brokers, traders, trading, security, encryption, VPN, certificate protected connection, database, foreign exchange (FOREX), CFD and Futures Industries, MetaTrader4 (MT4) platform.

This proposal was originally brought to STEP Fund by (in alphabetical order) George Popescu and M. Popovic.
(September 2007)

Status: Initial Due Diligence