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Preview of Award 1545814 - Final Project Report

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Cover

Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Grant or Other Identifying Number Assigned by Agency:	1545814
Project Title:	I-Corps: AutoEEG-enhancing productivity by autoscanning EEG signals
PD/PI Name:	Iyad Obeid, Principal Investigator Joseph Picone, Co-Principal Investigator
Recipient Organization:	Temple University
Project/Grant Period:	07/15/2015 - 08/31/2016
Reporting Period:	07/15/2016 - 08/31/2016
Submitting Official (if other than PD\PI):	Iyad Obeid Principal Investigator
Submission Date:	10/20/2016
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	Iyad Obeid

Accomplishments

* What are the major goals of the project?

The goals of the project were two-fold. The first goal was to train PI Obeid and Entrepreneurial Lead Meysam Golmohammadi in the "Lean Startup" methodology. This methodology has been redesigned specifically for the benefit of academic laboratories attempting to spin off commercializable technology. The second goal was specifically to develop a business case for the Team's "AutoEEG" technology, which uses machine learning to create a physician support tool for reading and scanning long term electroencephalograms.

* What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?

Major Activities: The Team (PI Obeid, Entrepreneurial Lead Golmohammadi, and Mentor Lou Boucelli) travelled to two NSF-I-Corps workshops (in Chicago, IL) and attended weekly online

training sessions. The Team made over 100 contacts in industry and government, and developed a more accurate assessment of the potential value of our company.

Specific Objectives:

As part of the customer discovery process, the Team interviewed 101 key stakeholders from the medical device industry, as well as insurance companies, physician endusers, and hospital purchasing experts. Experts were identified through the Team's own professional network as well as recommendations and internet research. Approximately 1/3 of the interviews were conducted in person with the remainder as voice or video conferences.

Significant Results:

8/16/15 DengShan Shiau, VP of Scientific Affairs, Optima Neuroscience 8/14/15 Donna DeMeo, Neuro ICU nurse, Jeanes Hospital
8/13/15 Dr. Anthony Murro, Neurologist, Georgia Regents University 8/14/15 Sergio Solis, Marketing Manager, Neurovirtual
8/13/15 Dr. Omotola Hope, Neurologist, University of Texas
8/11/15 Dr. Zulfi Haneef, Neurologist, Baylor College of Medicine
8/14/15 Dr. Ronald Peter Lesser, Neurologist, Johns Hopkins University
8/14/15 Dr. Madeline Fields, Neurologist, Mount Sinai Epilepsy Center
8/13/15 Dr. Alica Goldman, Neurologist, Baylor College of Medicine
8/14/15 Dr. Eva Ritzl, Neurologist, Johns Hopkins University
8/14/15 Dr. Bruce Fisch, Neurologist, University of New Mexico
8/12/15 Dr. Hasan Sonmezturk, Neurologist, Vanderbilt Department of Neurology
8/11/15 Dr. Steven Evans, Neurologist, University of Louisville
8/13/15 Sarah Doerrer, nurse practitioner, Johns Hopkins University
8/13/15 Dr. Kristen Heinan, Neurologist, UCLA
8/13/15 Dr. Joseph Neimat, neurosurgeon, Vanderbilt Medical Center
8/12/15 Dr. Amir Arain, Neurologist, Vanderbilt Medical Center
8/13/15 Dr. William Anderson, neurosurgeon, Johns Hopkins University
8/14/15 Chris Hamilton, Patient Monitoring Sales, Covidien
8/13/15 Dr. Selim Benbad, Neurologist, University of South Florida
8/13/15 Dr. Raman Sankar, Neurologist, UCLA
8/12/15 Dr. Adam Hartman, Neurologist, Johns Hopkins University
8/12/15 Dr. Peter Wolfe Kaplan, Neurologist, Johns Hopkins University
8/12/15 Dr. James Brenton, Neurologist, University of Virginia
8/14/15 Dr. Catherine Schevon, Neurologist/Professor, Columbia University 8/13/15 Soma Kalb, Director, Investigational Device Exemption, FDA
8/15/15 Hemen Oza, Software Functional Manager, Natus
8/10/15 Anatole Bragin, Neurologist/Assistant Professor, UCLA
8/10/15 Marc Nuwer, Neurologist/Assistant Professor, UCLA
8/8/15 Phil Dannewitz, Market Development Manager, Sunovion
8/5/15 Kathryn Davis, Neurologist/Assistant Professor, Hospital of the University of Pennsylvania
8/4/15 Dr. John Stern, Neurologist/Assistant Professor, UCLA
8/5/15 Monia Nencioni, business development manager, Bionen
8/8/15 Maria BaggettFernandez, Senior Sales Specialist, Mallinckrodt Pharmaceuticals
8/6/15 Fu Zhibinc, product development manager, Shenzen City Teveik Technology
8/8/15 Dr. Hisanori Hasegawa, Neurologist, VA Medical Center
8/8/15 Brigid Ring, CME Project Manager, Cleveland Clinic
8/8/15 Krista Shusta, neurology account executive, Athena Diagnostics 8/5/15 Jean-Regis Kunegel, Researcher, University City Science Center 8/5/15 Penny Peng, product development manager, NCC Medical 8/8/15 Brian Mehalick, Market Development Manager, Lundbeck
8/5/15 Marco Theobald, Senior Regulatory Specialist, Registrar Corp 8/8/15 Tricia Glending, Area Business Manager, Biogen
8/8/15 Om Vadlapatla, CEO, Klincis
8/8/15 Arnold Aguilera, Neurologist, small private practice office 8/8/15 Wayne Brooks, The health system manager, Allergan

8/8/15 Dr. Larry Blum, Neurologist, BALTIMORE WASHINGTON MEDICAL CENTER
8/5/15 Giridhar Kalamangalam, Neurologist/Assistant Professor, University of Texas
8/5/15 Jonathan Halford, Neurologist/Assistant Professor, University of South Carolina
7/31/15 Dr. Mark Quigg, Neurologist/Professor, University of Virginia
8/2/15 Dr. Howard Goodkin, Neurologist/Professor, University of Virginia 7/31/15 Chalita Atallah, Fellow, University of Maryland
7/31/15 Paul McGuire, EEG tech, University of Maryland
7/31/15 Dr. Allan Krumholz, Neurologist/Professor, University of Maryland
7/30/15 Vasileios Nasis, Ph.D, CEO, Netronics
7/28/15 Dr. Linda Selwa, Neurologist/Assistant Professor, University of Michigan
7/30/15 Carey Goodrich, Sales Representative, Compumedics
7/30/15 Dr. Stephen Thompson, Neurologist, University of Texas
7/30/15 Dr. Jerome Engel, Neurologist, UCLA
7/30/15 Harald Aurlien, Founder and CEO/Neurologist, Holberg EEG
7/29/15 Ana Skupch, Algorithm Design Engineer of Encevis, Austrian Institute of Technology GmbH
7/29/15 John Pollard, Neurologist, University of Pennsylvania
7/29/15 Dr. Irene Greenhouse, Neurologist, Holy Redeemer Hospital
7/29/15 Dr. David Cook, Neurologist (retired), Pennsylvania Hospital
7/27/15 Michelle Dougherty, Neurologist, Capital Health Medical Center
7/27/15 Mark Weiner, Chief Information Officer, Temple University Hospital 7/24/15 Camillo Gutterez, Neurologist, Temple Hospital
7/24/15 Kyle Hedges, Product Manager/EEG, Natus
7/24/15 Dick Moberg, Founder and CEO, Moberg Research, Inc
7/25/15 Dr. Katherine Taub, Pediatric Neurologist, The Children's Hospital of Philadelphia (CHOP)
7/23/15 Rick Beem, Sales Accounts Manager, EGI
7/23/15 Robert Laurenno, Chairman of Neurology, Washington Hospital Center 7/23/15 Augustin Legido, Chairman of Neurology, St. Christopher Children Hospital
7/23/15 Will Rosellini, CEO, Nuviant Medical, Inc.
7/22/15 Andre Waelkens, Customer Relations / Research & Development, BESA GmbH
7/22/15 Alissa Romano, Neurophysiologist, The George Washington University 7/22/15 Beth Thompson, Operations Manager, LifeLines Neurodiagnostic Systems 7/21/15 Dr. Joseph Schrandt, Neurologist, Wilmington Hospital
7/21/15 Jim Lawson, Marketing Director of North America, Nihon Koden
7/15/15 Philip Powel, EEG lab director, St. Christopher Hospital for Children
7/20/15 Jocelyn Cheng, Neurologist/Assistant Professor, Hahnemann University Hospital/Drexel Neurosciences Institute
7/19/15 Shahram Oveisgharan, Neurologist/Assistant Professor, Rush University Medical Center/Rush Alzheimer Disease Center
7/16/15 Mijail D. Serruya, Neurologist/Assistant Professor, Jefferson University/Co-Medical Director, Comprehensive Concussion Center
7/17/15 Maromi Nei/Michael R. Sperling, Neurologist, Jefferson Comprehensive Epilepsy Center
7/16/15 Michael Sperling, Professor/Neurologist/Director, Jefferson Comprehensive Epilepsy Center
7/16/15 George Carpenter, Chief Executive Officer, CNS Response Inc.
7/15/15 Dr. Keith Nagle, Neurologist, University of Vermont
7/15/15 Dr. Karen Carvalho, Pediatric Neurologist, Drexel University/St. Christopher Hospital for Children
7/13/15 Dr. Peter Crino, Neurologist, Temple University
7/13/15 Steven Tobochnik, Neurologists, Columbia University Medical Center 7/13/15 Bruce Miller, Sales Representative, Nihon Koden
7/12/15 Dr Elham Saedi, Neurologist, Tehran University Hospital
7/9/15 Thomas Bleck, Neurologist, Rush University Medical Center
7/9/15 Adam J. Simon, President / CEO, Cerora, Inc
7/9/15 Israel Raz, Vice President, Extera Partners

Filename	Description	Uploaded By	Uploaded On
	7/9/15 Kenneth Matt, Sales Manager, Natus		
	7/9/15 Zach Roberts, Sales and Customer Support, Persyst		
	7/8/15 Joe Camaratta, Former, General Manager, Category Solutions & Marketing GE Healthcare, UCSC		
	7/8/15 Kirk Rienbold, Former, Technology Leader Medical Products Group SRI International, UCSC		
	7/8/15 Nick Caffentzis, GM Strategic Alliances, GE Healthcare IT, GE Healthcare		7/8/15
	ADRIANA C. BERMEOVALLE, MD, Dr, Rush University Medical Center		Neurology

Key outcomes or Other achievements:

*** What opportunities for training and professional development has the project provided?**

This program supported the Team members to be trained in the Lean Startup methodology. As stated earlier, the training consisted of two 2day workshops as well as seven weekly online sessions. The curriculum was completely new to two of our three Team members (Obeid and Golmohammadi) and so there was a great overall effect from the training and professional development aspect of this support.

*** How have the results been disseminated to communities of interest?**

Nothing to report.

Products

Books

Book Chapters

Inventions

Journals or Juried Conference Papers

Licenses

Other Conference Presentations / Papers

Other Products

Company.

We have founded "Biosignal Analytics, LLC" to commercialize our technology.

Other Publications

Patents

Technologies or Techniques

Thesis/Dissertations

Websites

Supporting Files

Filename	Description	Uploaded By	Uploaded On
business_canvas.pdf	This document shows our final business canvas as lyad 05/23/2016 generated through the customer discovery process.	lyad Obeid	10/20/2016

Participants/Organizations

Name	Most Senior Project Role	Nearest Person Month Worked
What individuals have worked on the project?		
Name	Most Senior Project Role	Nearest Person Month Worked
Obeid, Iyad	PD/PI	1
Picone, Joseph	Co PD/PI	0
Golmohammadi, Meysam	Graduate Student (research assistant)	1
Bucelli, Louis	Consultant	1

Full details of individuals who have worked on the project:

Iyad Obeid

Email: iobeid@temple.edu

Most Senior Project Role: PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: PI - attended all training and workshop sessions, participated in customer discovery.

Funding Support: internal / Temple University

International Collaboration: No

International Travel: No

Joseph Picone

Email: joseph.picone@gmail.com

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 0

Contribution to the Project: Dr. Picone helped prepare the initial proposal and served as an advisor during the customer discovery activities.

Funding Support: internal / Temple

International Collaboration: No

International Travel: No

Meysam Golmohammadi

Email: tuf76412@temple.edu

Most Senior Project Role: Graduate Student (research assistant)

Nearest Person Month Worked: 1

Contribution to the Project: Entrepreneurial Lead - involved in all aspects of customer discovery, business plan development, minimal viable product and value proposition development. Attended all trainings and workshop.

Funding Support: NSF-ICorps Award 1545814

International Collaboration: No

International Travel: No

Louis Bucelli

Email: lou@bucelli.com

Most Senior Project Role: Consultant

Nearest Person Month Worked: 1

Contribution to the Project: Business mentor - attended all trainings and workshops and advised the team in creating value propositions and defining a minimum viable product. Actively involved in customer discovery.

Funding Support: Temple University

International Collaboration: No

International Travel: No

What other organizations have been involved as partners?

Nothing to report.

What other collaborators or contacts have been involved?

Nothing to report

Impacts

What is the impact on the development of the principal discipline(s) of the project?

The Team was able to better define the value proposition of their AutoEEG product and to determine which segments of the market to approach and how to cost the endproduct. Using knowledge and experience gained during ICorps, the team as incorporated as an LLC, moved to protect Intellectual Property, and has written three SBIR/STTR proposals (to NSF and NIH). One of these has funded and another is pending.

What is the impact on other disciplines?

Nothing to report.

What is the impact on the development of human resources?

Nothing to report.

What is the impact on physical resources that form infrastructure?

Nothing to report.

What is the impact on institutional resources that form infrastructure?

Nothing to report.

What is the impact on information resources that form infrastructure?

Nothing to report.

What is the impact on technology transfer?

We are working with the Temple University Technology Transfer office to patent our technology and license it back out to our LLC.

What is the impact on society beyond science and technology?

If successful, our commercial product will make it easier (and potentially more accurate) for neurologists to scan brain signals.

Changes/Problems

Changes in approach and reason for change

Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them

Nothing to report.

Changes that have a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals

Nothing to report.

Significant changes in use or care of biohazards

Nothing to report.

Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.

Nothing to report.