BME 484 Biomedical Engineering Capstone Design Project Proposal

Project Title: Using eye-blink detection for patients to call for a nurse.

- Team: Rachael Amore, Project Manager Jason Mercier, Hardware Engineer Sawyer Nichols, Software Engineer
- Abstract: The problem is that people who are completely paralyzed with the exception of eye movement need an easy way to call for a nurse if they need something. We propose using eye-blink detection to call a nurse. By the patient doing a specific series of blinks, the BLIP camera will recognize that the series represents a specific need. A message will then be sent to a nurse's phone saying that the patient is in need of something, such as food, water, assistance, or the bathroom.
- Innovation: It is a new way for people who are paralyzed to communicate with their nurse.
- Materials: BLIP Board, ICE 1000, 3-D printed protective case, tri-pod, previous teams code. License for Cross Core,
- Subtasks: Go over previous teams code and hardware. Develop new code that recognizes a series of blinks. Develop an app for the nurse's phone to get the alert. Have the code send an alert to the app, notifying the nurse of a patient in distress.
- Timeline: See attached excel spreadsheet.

References: Huang Q, et al. 2017. "An EOG-Based Human-Machine Interface for Wheelchair Control". Website. https://www.ncbi.nlm.nih.gov/pubmed/28767359 Królak A, Strumiłło, P. Univ Access Inf Soc (2012) 11: 409. <https://doi.org/10.1007/s10209-011-0256-6> Mohammed, Aree A. Anwer, Shereen A. 2014. "Efficient Eye Blink Detection Method for Disabled-Helping Domain." Website. https://www.researchgate.net/publication/307811266 Efficient Eye Blink Dete ction Method for disabled-helping domain> Miyakawa T, Takano H, Nakamura K, "Development of non-contact real-time blink detection system for doze alarm," SICE 2004 Annual Conference, Sapporo, 2004, pp. 1626-1631 vol. 2. http://ieeexplore.ieee.org/stamp.jsp</arnumber=1491689&isnumber=149168&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=14916&isnumber=1 32062> Emergency Nurse Call. Stanley HealthCare. <https://www.stanleyhealthcare.com/solutions/senior-living/resident-safety/emerg ency-nurse-call?creative=221600695324&keyword=%2Bnurse%20%2Bsystem&

matchtype=b&network=g&device=c&url=https%3A%2F%2Fwww.stanleyhealth

care.com%2Fsolutions%2Fsenior-living%2Fresident-safety%2Femergency-nurse -call&gclid=EAIaIQobChMIpN6g5rGt1gIVCTRpCh1sfgJ5EAAYAyAAEgIXmf D_BwE>

Curbell Medical. Specialty Call Cords.

<<u>http://curbellmedical.com/products/nurse-call/specialty-call-cords</u>>

Terashima, Yoshito, "Imaging apparatus, imaging apparatus control method, and computer program product, with eye blink detection features". U.S. Patent 8 253 848. April 9, 2010.

Cohen, Michael; Wang, Jue, "System and method for eye-tracking and blink detection." U.S. Patent 7 676 063. March 22, 2005.

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ME Capstone Design General Timeline	09/11/17	09/18/17	09/25/17	10/02/17	10/09/17	10/16/17	10/23/17	10/30/17	11/06/17	11/13/17	11/20/17	11/27/17	12/04/17	12/11/17	12/18/17	12/25/17	01/01/18	01/08/18	01/15/18	01/22/18	01/29/18	02/05/18	02/12/18	02/19/18	02/26/18	03/05/18	03/12/18	03/19/18	03/26/18	04/02/18	04/09/18	04/16/18	04/23/18	04/30/18	05/07/18
Team & topic	X	Х																																	
Design	X	Х																																	
IRB application (Due Sept 28)	X	Х																																	
UGI Proposal (Due mid Oct?)	X	Х																																	
Mid-year progress report	X	Х																																	
Project prototype	X	Х																																	
Testing & improvement	X	Х																																	
NEBEC Conference paper	X	Х																																	
Grant proposal (TBA)	X	Х																																	
NEBEC Conference (TBA)	X	Х																																	
Final Report	Х	Х																																	