MICHIGAN STATE UNIVERSITY

Project Plan Presentation

MSU – HFH Research Synergy Vanguard Portal (RSVP)

The Capstone Experience

Team Henry Ford Innovations RSVP

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Fall 2024



From Students... ...to Professionals

Project Sponsor Overview

- Henry Ford Health is an innovative delivery engine
- Nationally recognized leadership
- Clinical disease management + other areas of expertise
- Located in Detroit, Michigan



Project Functional Specifications

- Henry Ford Health aims to connect its employees with research institutions, however the current process is tedious
- MSU HFH RSVP aims to streamline the process between the two institutions
- Search algorithms and automated matching will work to facilitate meaningful collaborations

Project Design Specifications

- User account with an email sign up and user editable fields
- Search capabilities for desired users and concepts/topics
- Recommended user connections based upon specializations and personal interests
- User pages are accessible from potential matches and search results

Screen Mockup: Home Page



Screen Mockup: Search Page



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Screen Mockup: Overview Page

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HENRY FORD HEALTH + MICHIGAN STATE UNIVERSITY	RESEARCH SYNERGY VANGUARD PORTAL	HOME
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	Overview Neme: Scott: A Dukchawky Title : MD Biography Dr: Duchawing Is currently a professor: of surgery, molecular biology, and genetics at Wayne State biology and genetics at Wayne State Driversity School of Medicine. He serves as the Ray D. McClaire Chairman of Surgery and the Surgeon in Crief at Nemy First Health System in Detroit, Micrigan, He is the foundation and CEO of the Innovation institute at Heiny Ford Health System in Detroit, Micrigan, He is the foundation and CEO of the Innovation institute at Heiny Ford Health Romand and medical companies in the Indecial device and software industry and manages multiple innovation grants. Dr. Duchawsky is a principal liversitigator for NASA Heinessanth focus involves the thing ultimound to the astronaut and commondum creas of inemational Space	
	What institution are you affiliated what	Henry Ford Health
OVERVIEW	What is your convent role? What department/newarch area are you part of?	Clinical Administrative Staff Biomedical Sciences
CONTACT	What are your primary research interests?	Public Heath
	What funding do you access to?	Private-industry Funding
	What type of resources/tools do you monthy use?	Statistical Software
	What equipment do you have access to?	Imaging Equipment

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Screen Mockup: Background Page

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2	Work Experience: CEO of the Henry Ford Innovation Institute Principal Investigator for NASA	
	Education and Qualifications: Wayte State University, M, 1999	Certification: American Board of Surgery - Surgery
	Wayne State University, Mi, 1983	Vice Chair for Technology and Research - American Coblege of Surgeons
OVERVIEW	Residency: Wayne State University, Surgery, MI, 1988	Committee of Trauma - American College of Surgeons
BACKGROUND		
CONTACT	Research and Recent Works: Immunemadulation by Cesumin - Geutam SC., Geo X., D	ulchavsky S.

Screen Mockup: Contact Page

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Screen Mockup: Sign Up (Question 4)

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HENRY FORD HEALTH + MICHIGAN STATE UNIVERSITY	Sign Up	
	← BACK	
	What are your primary research interests	
	Genomics/Precision Medicine Health Technology/Innovation	
	Disease Prevention/Management	
	Save and Continue	

Screen Mockup: Sign Up (Question 8)

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Clinical Data/Population Health Information Data Analytics/Computing Resources Funding Opportunities Other: Type here.		What are you seeking?	
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Other: Type here		Clinical Data/Population Health Information	
		(Data Analytics/Computing Resources) (Funding Opportunities)	
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Project Technical Specifications

- Front end implemented with React-based portal using HTML, CSS, and JavaScript
- Back end powered by Flask which handles search queries and user profile management
- Back end database utilizes MongoDB
- Back end utilizes BERT (Bidirectional Encoder Representations from Transformers) to generate semantic embeddings which are processed by Elasticsearch to handle user searches

Project System Architecture



Project System Components

- Hardware Platforms
 - Physical Linux Server
- Software Platforms / Technologies
 - React (Front end)
 - Flask (Back end)
 - BERT (Back end)
 - Elasticsearch (Back end)
 - Python (Back end)
 - MongoDB (Database Management)
 - Apache (Server)
 - PyTorch (Back end)
 - Docker (Containerization)

Project Risks

- Risk 1
 - Running the BERT language model on a physical server
 - Implement search capabilities early in development to test our resources. If it performs poorly, host the platform on cloud.
- Risk 2
 - Procuring data from MSU Scholars or HFH Scholarly Commons
 - If access through an institution's API or raw data is not possible, we will populate the database with mock data through web scraping.
- Risk 3
 - Varying data standards and data organization
 - Expecting the two institutions to have varying data schemas, we will have to preprocess data and select the most essential aspects from both institutions to ensure a successful search engine

Questions?

