

Food Information Networks (FINs): Building data-driven supports for increasing access and healthy food choices in low-income neighborhoods

Award ID#: 2021-67022-33447

Ron Metoyer, University of Notre Dame
IRG-1, FY2020



Principal Investigators

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- Tawanna Dillahunt, University of Michigan

Senior Personnel

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- Heather Eicher-Miller, Purdue University Dept. of Nutrition Science
- Alisa Zornig-Gura, Center for Civic Innovation
- Elizabeth Oyer, Eval Solutions

Community Partners

- Beckie Lies, Purdue Extension
- Gillian Shaw, Pete Freeman, and Michelle Sawwan enFocus
- Sue Taylor, Beacon Community Impact
- Robin Vida, St. Joseph County Health Department



ST. JOSEPH COUNTY
DEPARTMENT OF HEALTH
Prevent. Promote. Protect.

Extension - St. Joseph County



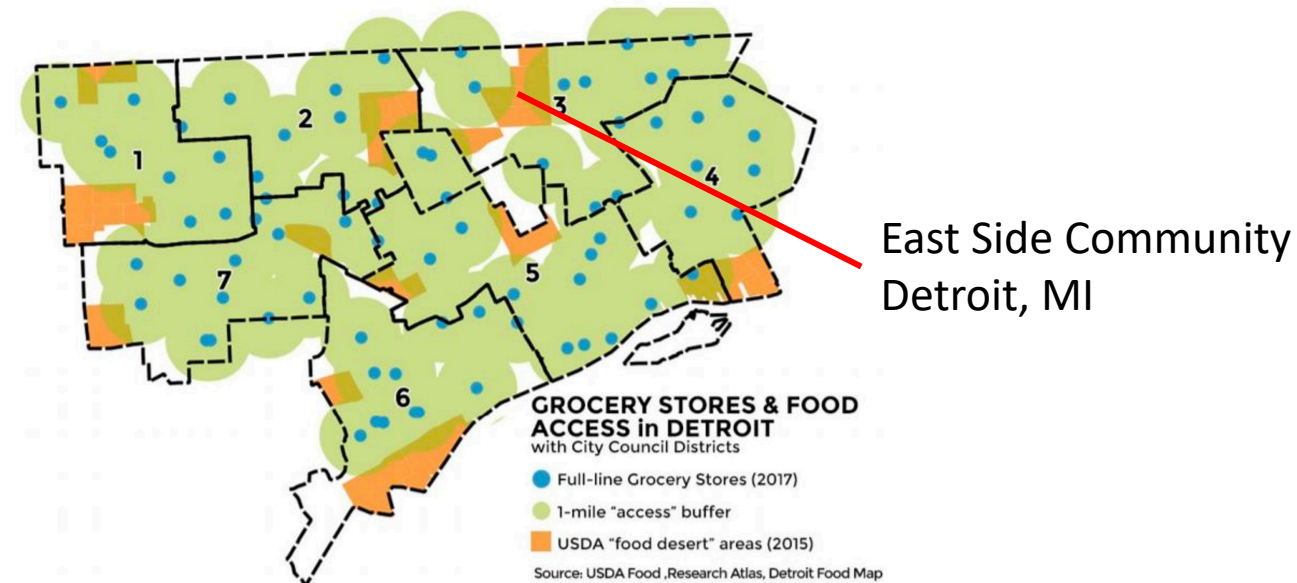
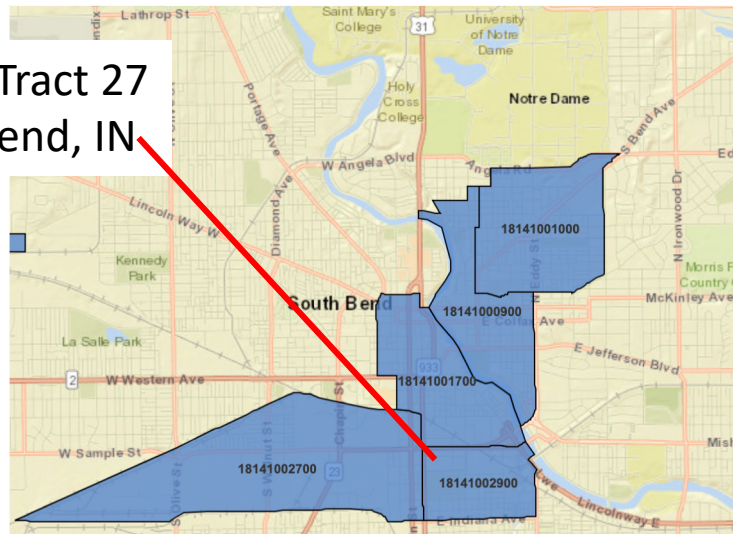
Department of Nutrition Science



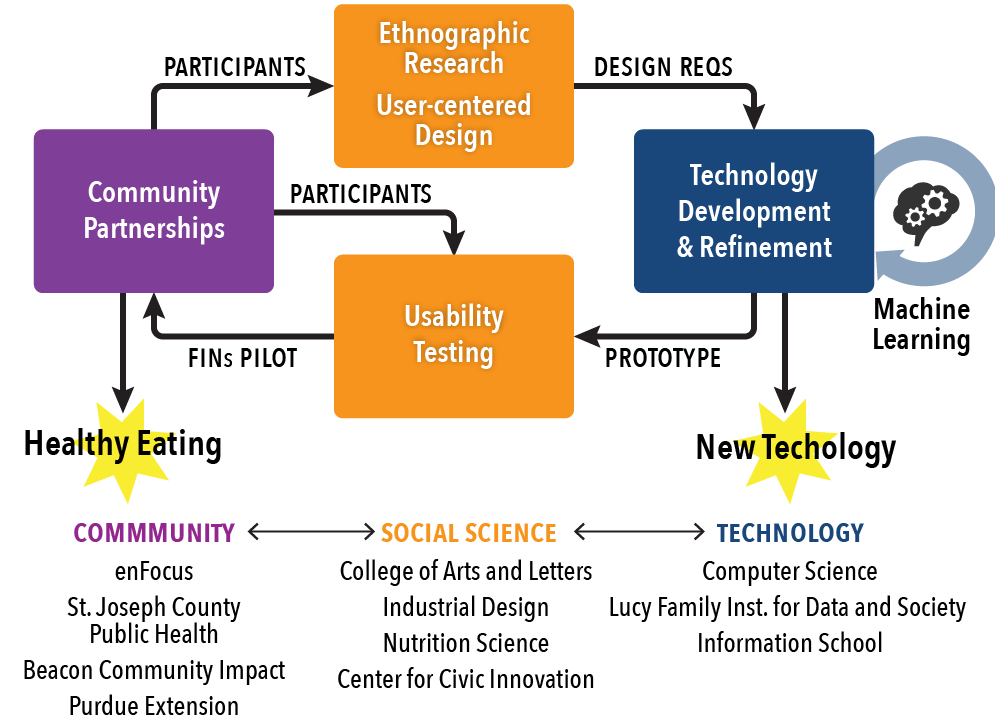
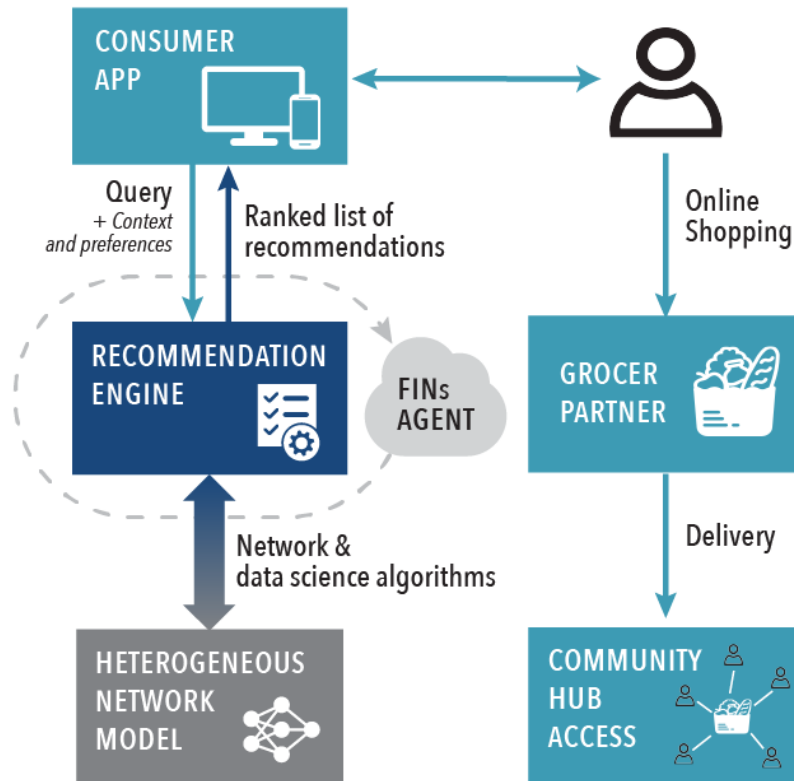
Project Overview

- Healthy eating is a critical problem in many low-income communities across the country where the combination of economic constraints, distance to full-service supermarkets, and access to transportation make healthy, affordable food less attainable.
- The limitations introduced by poverty and lack of access, in combination with the need to prioritize dietary quality, creates a difficult personal optimization problem.
- **Technological Advance:** healthy food recommendation and optimization under the constraints of poverty that deeply integrates ethnographic data into a food network model.
- **Social Science Advance:** an understanding of the feasibility and effectiveness of a food-hub delivery model and how it affects the food acquisition / shopping experience as we currently know it.

Census Tract 27
South Bend, IN



Project Overview

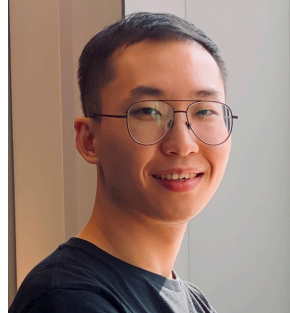


- Deep ethnographic engagement and user-centered design will inform the design and development of the FINs App backed by a heterogeneous network model that powers a food recommendation engine
- A final year pilot will examine the effectiveness of the FINs app in combination with a Food Hub Delivery Model in support of access to healthy food

Project Update

Ramp Up

- Kickoff Meeting
- Project Retreat
- Student Team



Advisory Board

- Jim Conklin – Cultivate Culinary Food Rescue
- Cary McClendon – Meijer Foods
- Fire Chief Buchanon – South Bend Fire Dept.



Project Update

Modeling

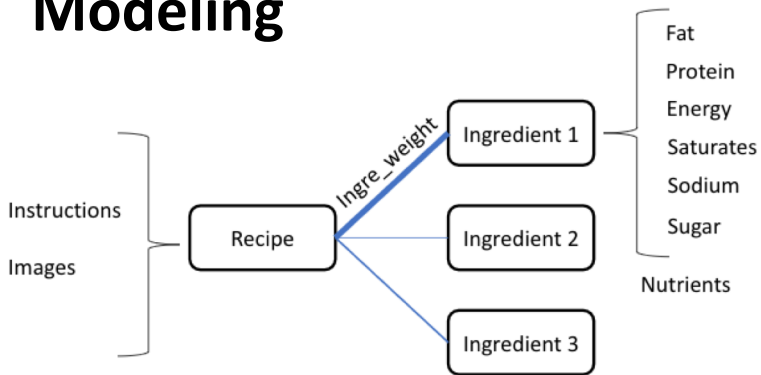


Table 1: Cuisine Category Classification Results (best results in bold)

Metric	Method	Others	Appetizer	Beverage	Bread	Soups	Salads	Desserts	Vegetables	Main-dish	Total
Precision	word2vec	38.2	53.2	66.6	65.9	36.2	46.6	65.7	42.5	51.1	59.9
	Instruction	41.7	46.6	67.2	66.7	25.9	47.6	78.6	81.8	49.7	61.9
	Receptor	48.7	55.5	76.5	68.6	16.7	56.4	72.4	48.3	57.9	65.4
	DeepWalk	43.4	77.5	81.3	79.6	54.1	62.8	64.1	62.1	56.5	64.9
	GAT	50.2	61.4	77.2	78.3	30.9	60.2	80.8	63.3	62.3	70.1
	RGCN	56.2	62.5	84.1	80.6	58.5	64.9	78.5	58.2	71.5	73.6
	OursFCN OursRelAtt OursLSTM										
Recall	word2vec	45.7	33.5	53.8	70.0	7.42	38.8	81.1	17.8	51.6	56.7
	Instruction	46.1	21.0	77.7	65.0	6.11	55.4	70.2	1.28	86.2	60.2
	Receptor	48.1	40.6	67.7	69.4	0.43	49.9	83.6	28.4	74.3	65.7
	DeepWalk	50.2	21.7	62.4	54.8	7.87	35.6	89.0	25.5	71.9	62.1
	GAT	52.9	45.6	82.3	73.0	51.1	57.3	80.1	37.0	73.9	69.1
	RGCN	57.8	49.1	77.3	71.4	31.4	63.7	86.4	63.1	74.4	73.0
	OursFCN OursRelAtt OursLSTM										
F1	word2vec	41.6	41.1	59.5	66.0	12.3	42.3	72.6	25.1	51.4	58.2
	Instruction	43.8	28.9	72.1	65.8	9.89	51.2	74.1	2.53	63.1	61.1
	Receptor	48.4	46.9	71.8	69.0	0.85	53.0	77.6	35.8	65.1	65.6
	DeepWalk	46.6	33.9	70.6	65.0	13.8	45.4	74.5	36.2	63.2	63.4
	GAT	51.5	52.4	79.7	75.6	38.5	58.7	80.5	46.7	67.6	69.6
	RGCN	57.0	55.0	80.6	75.7	40.9	64.3	82.3	60.6	72.9	73.3
	OursFCN OursRelAtt OursLSTM										

Ethnographic Study Design & Recruiting

FREE \$100 KROGER GIFT CARD

TO PARTICIPATE IN 60-MINUTE INTERVIEW



LA CASA DE AMISTAD JUNE 6TH AT 2:30PM

The Center for Civic Innovation is creating new ways to make your grocery shopping and food pick-up easier.

We want to know how you shop for and prepare healthy food at home.

Text (574) 501-9225 to see if you are eligible



FOOD ACCESS STUDY

FREE \$100 KROGER GIFT CARD

TO PARTICIPATE IN A 60-MINUTE FOCUS GROUP



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Project Evolution

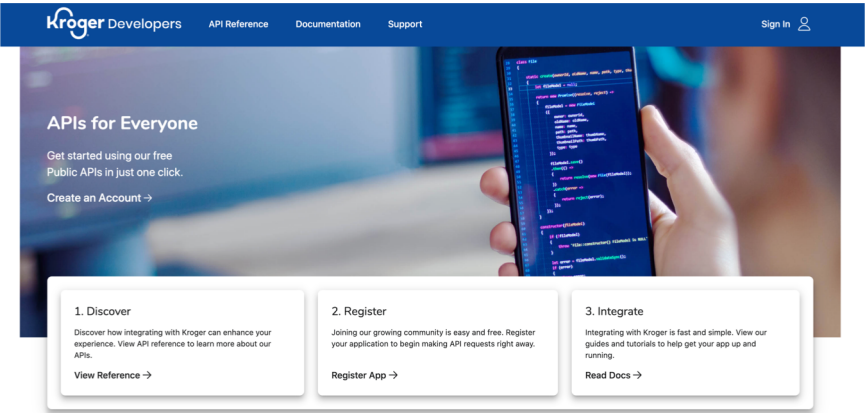
Recommendation
Granularity



VS



Technical and
Policy Barriers



Anticipated outcomes & success measures for next year

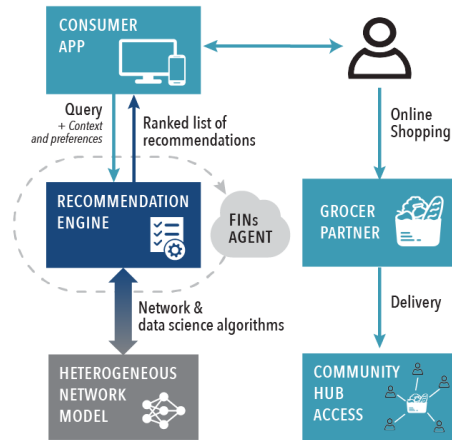
Expected Outcome	Activity	Successful If ...
Understanding of motivations, needs, barriers of our focus community	Interviews & Observations	Complete ethnographic interviews, observations, and data analysis
Complete V1 of FINs network model	Data acquisition and modeling	Model outperforms baselines on fundamental tasks (classification, link prediction, recommendation) and generates acceptable recommendations
FINs App Interface Design V1	Development & User Testing	V1 Design meets needs identified in #1

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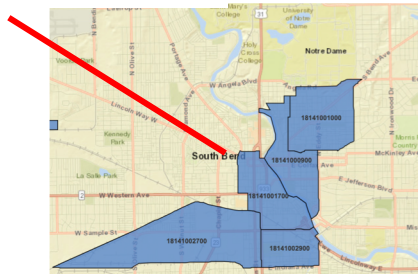
Visual Schematic



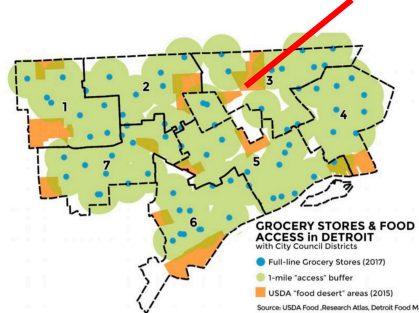
Use-Inspired Research

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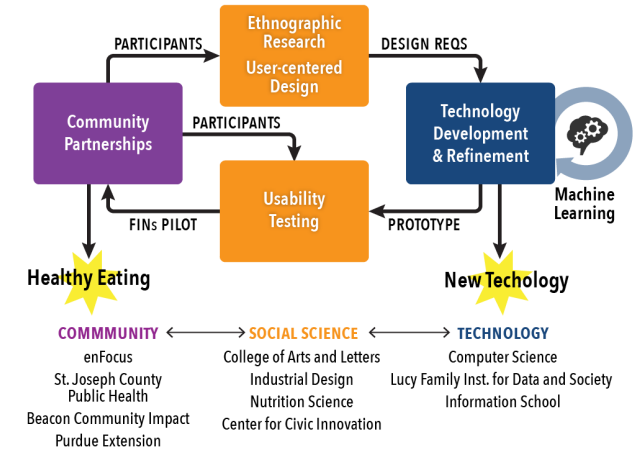
Census Tract 27
South Bend, IN



East Side Community
Detroit, MI



Project Vision



Fundamental Research Contributions

- **Technological Advance:** healthy food recommendation and optimization under the constraints of poverty that deeply integrates ethnographic data into a food network model.
- **Social Science Advance:** an understanding of the feasibility and effectiveness of a food-hub delivery model and how it affects the food acquisition / shopping experience as we currently know it.