AI FOR HEALTHCARE SUPPORT FOR ELDERLY PEOPLE

BUSINESS ANALYSIS 3.2

OUTLINE

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Source: https://i.guim.co.uk/img/media/e99464f60a7fdf337fcc4dda5ebdafaa5b56cad0/0_0_3000_1800/master/3000.jp

AI Solution

Our AI solution that we propose solves the problem by creating an integrated healthcare system tailored to the needs of the elderly by using wearable devices such as smart watches. AI-based analytics and remote sensing technology (robots, drones, cameras, voice assistants, biometrics, etc.), with sensors, actuators, software, and cloud connectivity, to collect, analyze, and provide personalized healthcare in real time. Equipped with artificial intelligence algorithms, these devices will monitor vital functions and movement patterns, detect abnormalities, and alert nurses or experts if necessary. Natural language can be used to provide easy channels of communication for elderly individuals to express their health concerns and get advice through voice assistants. They will also help elderly people get answers to important questions about various illnesses, learn about symptoms, identify treatments, and get medical advice. Biometric technology can play an important role in supporting healthcare for the elderly. It will be used to secure patient identification, ensure the accuracy of medical records, and prevent errors. Biometric data such as fingerprints, retinal scans, and facial recognition will help track medication compliance, allowing experts to know if medications are being taken as prescribed.

Business objectives

- **Enhance Healthcare Quality**
- **Increase Efficiency**
- **Promote Aging in Place**
- **Health Outcomes**
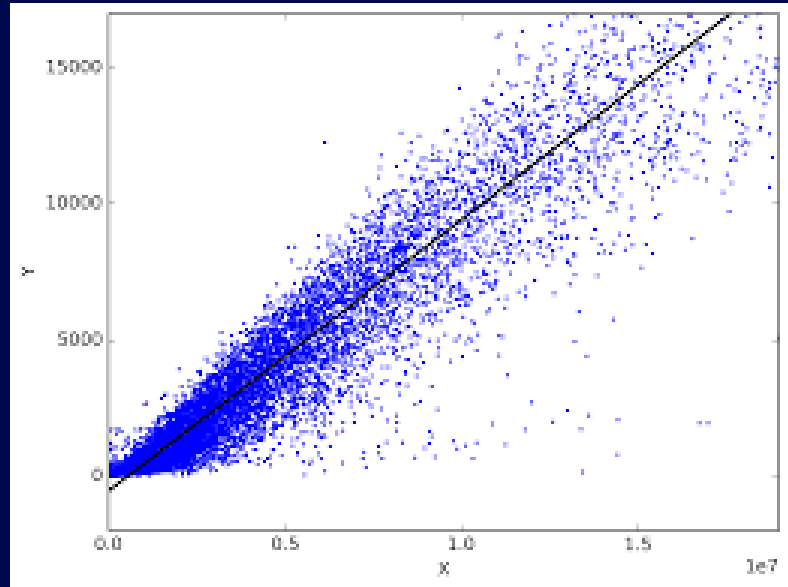- **Resource Efficiency**
- **Patient Satisfaction**

Image Source: https://i.guim.co.uk/img/media/f6fa9d1a11518d685e5179659e7e730b8c42b1a6/0_0_4426_3667/

Business objectives Continue…

- Business Background
- Requirements
- Constraints
- Risks
- Tools
- Techniques

Source: https://i.stack.imgur.com/SbqXz.png

Problem definition

- Challenges Faced by Elderly Individuals

- Limitations of Existing Healthcare Systems

- Misdiagnosis

- Monitoring Health

- Early Intervention

- Personalized Care Plans

Image Source: https://insights.omnia-health.com/sites/omnia-health.com/

Machine Learning

- Supervised Learning
- Dataset
- Random Forest Classifier
- Evaluation
- Classification Algorithms

Source: https://i.stack.imgur.com/SbqXz.png

Data and Model

- Data Articulation

- Relevant Data

- Well-defined Plan

- Evaluation Metrics

Time Series Analysis on Data

- Time-in and Time-out data

- Timestamps

- determine peak visit times

- ARIMA

- LSTM

The technologies diagnostics companies expect to introduce over the next five years

	Highly likely	Somewhat likely	Unlikely
Cloud computing	64%	33%	4%
Artificial intelligence	60%	37%	
Blockchain –like-technoloy	40%	49%	11%
Nanotechnology	36%	48%	16%
Virtual reality/Augmented reality	35%	56%	10%
Quantum computing	26%	49%	25%
Digital twins	23%	56%	20%

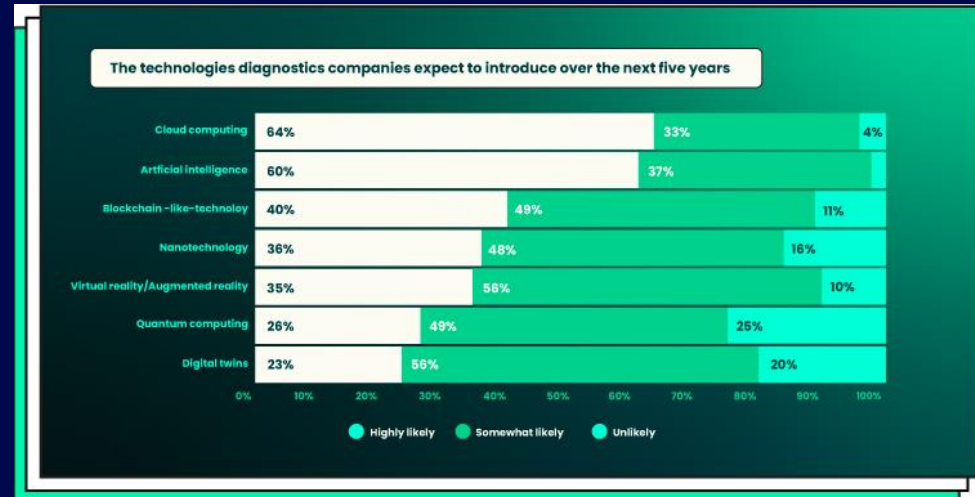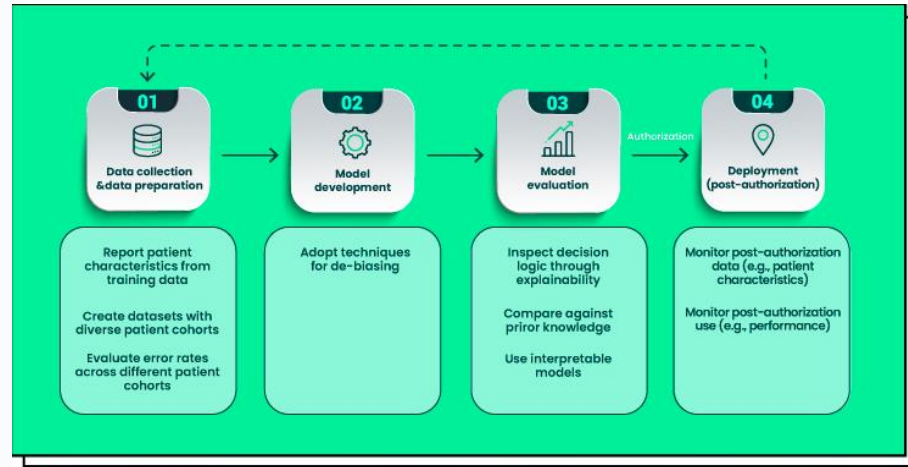Image Source: https://forbytes.com/wp-content/uploads/2023/03/healthcare-data-sets.jpg

Solution Techniques

- *Age Analysis*
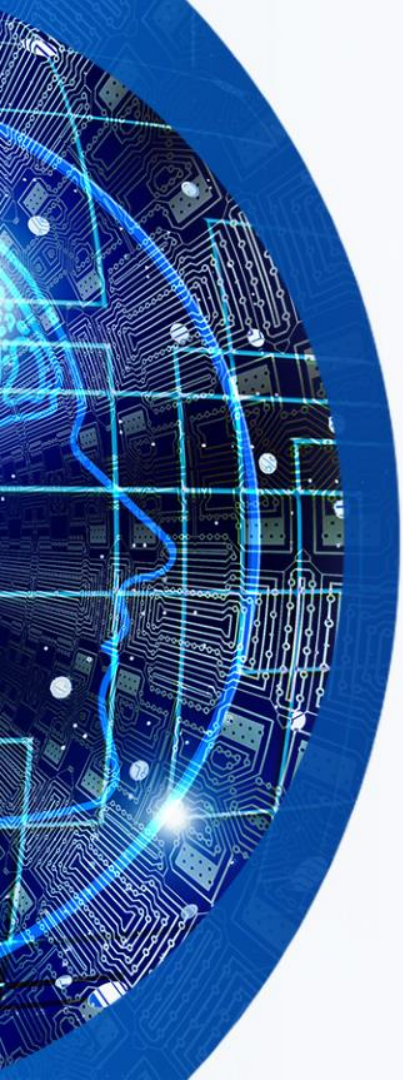- *Healthcare Utilization Patterns*
- *Improving Model Accuracy*

Natural Language Processing

- **Achievability**

- **Text Classification**

- **Named Entity Recognition**

- **Sentiment Analysis**

RAW Data

	A
1	,class,filename,height,width,xmax,xmin,ymax,ym
2	0,moose,image129.jpg,427,500,475,36,427,53
3	1,coyote,image292.jpg,416,600,453,107,333,32
4	2,deer,image363.jpg,381,500,254,1,381,18
5	3,coyote,image223.jpg,400,500,434,59,313,114
6	4,moose,image118.jpg,333,500,418,115,333,63
7	5,bear,image15.jpg,333,500,292,97,208,53
8	6,moose,image195.jpg,434,500,378,97,303,10
9	7,moose,image192.jpg,375,500,339,182,300,31
10	8,deer,image375.jpg,375,500,376,85,357,64
11	9,moose,image160.jpg,333,500,396,194,276,66
12	10,moose,image115.jpg,338,450,338,130,312,62
13	11,moose,image133.jpg,334,500,389,110,289,39
14	12,coyote,image230.jpg,333,500,500,95,332,32
15	13,moose,image131.jpg,375,500,310,114,309,98
16	14,bear,image5.jpg,375,500,232,37,263,176
17	15,deer,image367.jpg,361,500,345,38,361,30
18	16,coyote,image256.jpg,347,500,373,154,347,72
19	17,deer,image396.jpg,375,500,405,199,348,86
20	18,bear,image27.jpg,375,500,346,164,336,56
21	19,bear,image18.jpg,333,500,497,115,333,31
22	20,bear,image21.jpg,333,500,303,147,197,56
23	21,bear,image48.jpg,399,500,406,101,320,41
24	22,deer,image357.jpg,333,500,212,26,279,92
25	23,deer,image357.jpg,333,500,477,312,294,89
26	24,deer,image350.jpg,333,500,373,99,315,20
27	25,deer,image368.jpg,375,500,466,82,375,27
28	26,deer,image334.jpg,415,500,455,102,344,60
29	27,deer,image372.jpg,500,500,298,59,481,13

Deep Learning

- Key techniques and applications

- *Recurrent Neural Networks*

- Transformer Models for (NLP)

- Generative Adversarial Networks

- Transfer Learning

- Autoencoders for Feature Extraction

- Deep Reinforcement Learning

Image Source: https://i0.wp.com/www.datalabeler.com/wp-content/uploads/2021/08/Data-labeler-ai-healthcare.jpeg?w=1059&ssl=1

Conclusion

our AI-driven healthcare support solution for elderly individuals represents a comprehensive and innovative approach to addressing the unique healthcare challenges faced by this demographic. We have meticulously designed and articulated every aspect of our solution, from data handling to deep learning techniques, with a strong emphasis on relevance, accuracy, and effectiveness.

Our data management processes ensure that relevant information, including demographic data, healthcare utilization patterns, and medical records, are leveraged effectively to provide personalized and proactive care.

The application of deep learning techniques, including CNNs, RNNs, Transformers, GANs, transfer learning, autoencoders, and deep reinforcement learning, plays a pivotal role in enhancing the quality of healthcare services. These techniques enable us to analyze diverse data types, from medical images to textual medical records, facilitating early detection, trend analysis, and personalized treatment recommendations.