Negative: Digital Triage Assistant

By “Coach Vance” Trefethen

***Resolved: The United States federal government substantially reform the use of Artificial Intelligence technology***

Case Summary: The AFF plan will “implement Digital Triage Assistant.” DTA is a body-worn device that measures body vital signs to give early indications to medical staff of the severity and condition of the patient. “Triage” (from the French word “trier,” meaning to sort or evaluate and classify by sorting) is the action taken in hospital emergency rooms upon initial entrance of the patient, where the nurses evaluate how serious the condition is, to determine who needs to get into the hospital quickly and who can wait a while.
 DTA is “A portable and automated vital sign data acquisition device and triage information system has been devised to improve the efficacy and efficiency of the triage process in hospital Emergency Departments. The system is comprised of: 1) a microcontroller-based data-acquisition device 2) off-the-shelf and proprietary sensor components 3) a PDA with barcode scanner 4) a networked patient information database.” (https://www.researchgate.net/publication/224135650\_Digital\_Triage\_Assistant)

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Status Quo is already doing DTA development 2

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DTA is still in the prototype stage as of Sept 2021. And Affirmative cannot fiat that a Czech university will do their plan 2

3. AI part not working yet 2

Czech government is still testing it. And “eventually” they’ll connect it to AI. Eventually. 2

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Negative: Digital Triage Assistant

INHERENCY

1. Status Quo already doing it

Status Quo is already doing DTA development

US Army Corps of Engineers 2021. “NATO supports new technology in the Czech Republic to help save lives” <https://www.lrb.usace.army.mil/Media/Videos/videoid/810016/> (accessed 27 Nov 2021)



SOLVENCY

1. Not ready yet - Still under development and 2. Owned by a Czech university

DTA is still in the prototype stage as of Sept 2021. And Affirmative cannot fiat that a Czech university will do their plan

Medha Kallem 2021 (journalist) 9 Sept 2021 “Hopkins undergraduates partner with NATO to reduce combat casualties” THE JOHNS HOPKINS NEWSLETTER <https://www.jhunewsletter.com/article/2021/09/hopkins-undergraduates-partner-with-nato-to-reduce-combat-casualties> (accessed 27 Nov 2021) (brackets added)

[DTA student developer Jonathan] Edwards explained the value of the DTA is the structure it brings to the triage process, so people in need of emergency help are identified and medics can disperse resources more efficiently. The team partnered with Czech Technical University in Prague (CTU) to create a prototype wearable for their software. Calvo and Edwards worked with CTU’s computer science team to build an initial [prototype](https://youtu.be/iExJLQE6yGc), which involved sensors strapped to a soldier’s torso to monitor their vitals.  Calvo explained that the team has done as much as they can to contribute to the project. The Czech team is now continuing to develop the DTA. Around August 13, the Czech team tested the software and wearables in a simulation. They are currently collaborating with Garmin to create a watch that would replace the sensors on the soldier’s torso.

3. AI part not working yet

Czech government is still testing it. And “eventually” they’ll connect it to AI. Eventually.

Darko Manevski 2021 (journalist) 17 Aug 2021 “VIDEO: Robo-Doc: AI Medic Program Will Save Lives On The Battlefield “ <https://www.zenger.news/2021/08/17/video-robo-doc-ai-medic-program-will-save-lives-on-the-battlefield/> (accessed 27 Nov 2021)

The battlefield [Digital Triage Assistant](https://designday.jhu.edu/wp-content/uploads/formidable/6/DTA-Design-Day-David-Calvo.pdf) (DTA) system was tested by the Czech military during a training exercise in an unspecified part of the Czech Republic on Aug. 13. The device is strapped to soldiers to gather data on injuries and providing medics with live updates on their health status. Eventually, that data will also be relayed to an AI unit in the device that will analyze and advise medical teams on the ground and at hospitals.

Czech developers say AI will be added later

Kristina Soukupová 2021 (President, DefSec Innovation Hub, Czech Republic – part of the group that’s researching DTA) quoted by US Army Corps of Engineers “NATO supports new technology in the Czech Republic to help save lives” <https://www.lrb.usace.army.mil/Media/Videos/videoid/810016/> (accessed 27 Nov 2021)

“The system consists of sensors that we put on soldier’s body that monitor his or her heart beat, breath rate, and so on and so forth, some other parameters. But also a software part, which shows where the soldier is and how heavily wounded he or she is. We’re also planning on adding an artificial intelligence capability that will calculate mortality likelihood score, which basically shows immediately whether a wounded soldier is likely to die.”

4. No existing app meets the criteria for success

Aug 2021 study finds no existing triage apps meet the criteria for successful roll-out

[Isabel Herrera Montano](https://www.ncbi.nlm.nih.gov/pubmed/?term=Montano%20IH%5BAuthor%5D&cauthor=true&cauthor_uid=34387773), [Isabel de la Torre Díez](https://www.ncbi.nlm.nih.gov/pubmed/?term=de%20la%20Torre%20D%26%23x000ed%3Bez%20I%5BAuthor%5D&cauthor=true&cauthor_uid=34387773), [Raúl López-Izquierdo](https://www.ncbi.nlm.nih.gov/pubmed/?term=L%26%23x000f3%3Bpez-Izquierdo%20R%5BAuthor%5D&cauthor=true&cauthor_uid=34387773), [Miguel A. Castro Villamor](https://www.ncbi.nlm.nih.gov/pubmed/?term=Villamor%20MA%5BAuthor%5D&cauthor=true&cauthor_uid=34387773)  and [Francisco Martín-Rodríguez](https://www.ncbi.nlm.nih.gov/pubmed/?term=Mart%26%23x000ed%3Bn-Rodr%26%23x000ed%3Bguez%20F%5BAuthor%5D&cauthor=true&cauthor_uid=34387773) 2021. (Montano and Diez - Dept of Signal Theory, Communications and Telematics Engineering, Univ of Valladolid, Spain. Izquierdo - Emergency Department. Hospital, Universitario Río Hortega, Valladolid, Spain. Villamor and Rodriguez - Advanced Clinical Simulation Center, School of Medicine, Univ of Valladolid, Spain) Mobile Triage Applications: A Systematic Review in Literature and Play Store 13 Aug 2021 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8361243/> (accessed 27 Nov 2021)

In this research work, a review in scientific databases of existing papers in the literature studying or proposing mobile apps for emergency triage and catastrophe triage was carried out. A total of 26 relevant papers were selected for this study, of which 13 apps were identified. After searching for each of these apps in the Google Play Store platform, only 2 of them were obtained, and these were subsequently evaluated together with another app obtained from the link provided in the corresponding paper. In the analysis carried out, it was detected that from 2019 onwards there has been increasing interest in research in this regard, given the need for early selection of the most serious patients in such difficult times for the health service. In addition, the review identified an increase in mobile app research focused on Emergency Triage and a decrease in app studies for triage catastrophe. In this study it was also observed that despite the existence of many researches in this regard only 3 apps contained in them are accessible. "TRIAGIST" does not allow the entry of an unidentified user, "Major Trauma Triage Tool" presents negative comments from users who have used it and "ESITriage" lacks updates to improve its performance. In view of the above, as future lines of work, we propose the creation of an app accessible to all users that can be used both in prehospital care and in the emergency department, guaranteeing continuity of care, based on a mixed model of the physiological triage system (start) with an anatomical injury triage system. In addition, it must provide a geolocation with mapping to show the best route and the most appropriate center for the patient. It must also indicate the essential actions to be performed according to the priority level, for example: level 1, emergency (red flag), the system must ask the rescuer: have you checked the airway, is it necessary to administer oxygen, have you performed hemorrhage control, etc. This ensures the integrity of the treatment even when the rescuer is inexperienced.

5. No standard of assessment for triage (but with more study there will be someday)

Need to have an agreed framework for assessing the accuracy of AI triage diagnostics. There will be one someday, after more study

[Adam Baker](https://www.frontiersin.org/people/u/928012), [Yura Perov](https://www.frontiersin.org/people/u/842098), Katherine Middleton, [Janie Baxter](https://www.frontiersin.org/people/u/966068), [Daniel Mullarkey](https://www.frontiersin.org/people/u/932145), Davinder Sangar, Mobasher Butt, Arnold DoRosario and [Saurabh Johri](https://www.frontiersin.org/people/u/1133875) 2020. (all except Rosario are with Babylon Health, London, UK. Rosario – is with Northeast Medical Group, Yale New Haven Health, USA) 30 Nov 2020 A Comparison of Artificial Intelligence and Human Doctors for the Purpose of Triage and Diagnosis (accessed 27 Nov 2021)

Finally, we acknowledge the need for standardized evaluation protocols and datasets that allow for a robust and fair comparison of different symptom checkers. No agreed framework currently exists for assessing such AI systems as there is for new drugs or surgical interventions, which presents a challenge for regulating bodies. However, we are encouraged by the recent step taken by the World Health Organization (WHO) and the International Telecommunication Union (ITU) in establishing a Focus Group on Artificial Intelligence for Health (FG-AI4H) with the aim of developing a benchmarking process for applications of AI-assisted healthcare technologies ([Wiegand et al., 2019](https://www.frontiersin.org/articles/10.3389/frai.2020.543405/full#B28)). Through our active participation in this focus group we hope to contribute toward developing an open and transparent framework for evaluating symptom checkers that can build trust in this technology.

6. Rollout before ready

Link: AFF Plan launches DAT before it’s ready

Cross apply our other solvency evidence

Impact: Failure. Companies that roll out software products before they’re ready set themselves up for failure

Gretel Going 2017 (co-founder of [Channel V Media](http://channelvmedia.com/), working with tech and media companies to break into new markets or gain visibility in crowded ones ) Too Soon? How to Avoid A Tech Product Launch Fail” 14 Apr 2017 FORBES <https://www.forbes.com/sites/forbesagencycouncil/2017/04/14/too-soon-how-to-avoid-a-tech-product-launch-fail/?sh=5705721d6aa1> (accessed 27 Nov 2021)

You have a disruptive tech product, an inspiring vision, and the team necessary to take it to market. What could possibly go wrong? You launch your product before it’s ready. Maybe you do this out of impatience – you’ve been working on your product for years and you just want to get it out there. Or maybe you’re a stickler for meeting arbitrary deadlines and operate according to the rule of “it’s never going to be perfect, so let’s just pick a date and stick to it.” Or perhaps you simply cave to pressure from investors, an overeager founder or board members. Whatever the reason, jumping the gun on a product launch can have serious adverse consequences on a company’s success. Software and cloud-based tech products, in particular, are prime candidates for premature launches. By design, they offer creators the flexibility to make critical updates and fixes *after* they’re out on the market. And all too often, companies use this as an excuse to begin talking to media about their product before they should.

DISADVANTAGES

1. Displaces more effective system

Link: The Babylon System. The Babylon Triage & Diagnostic System

[Adam Baker](https://www.frontiersin.org/people/u/928012), [Yura Perov](https://www.frontiersin.org/people/u/842098), Katherine Middleton, [Janie Baxter](https://www.frontiersin.org/people/u/966068), [Daniel Mullarkey](https://www.frontiersin.org/people/u/932145), Davinder Sangar, Mobasher Butt, Arnold DoRosario and [Saurabh Johri](https://www.frontiersin.org/people/u/1133875) 2020. (all except Rosario are with Babylon Health, London, UK. Rosario – is with Northeast Medical Group, Yale New Haven Health, USA) 30 Nov 2020 A Comparison of Artificial Intelligence and Human Doctors for the Purpose of Triage and Diagnosis (accessed 27 Nov 2021)

The Babylon Triage and Diagnostic System is designed to provide users with triage advice alongside an explanation of why this action has been suggested; this consists of any reported symptoms that require urgent attention, and/or a list of possible causes for the user’s symptoms. A comprehensive description of the system that powers the Babylon Triage and Diagnostic System is outside of the scope of this paper, however we provide a brief summary of this system by way of background. The Babylon Triage and Diagnostic System–a new implementation after the previous generation ([Middleton et al., 2016](https://www.frontiersin.org/articles/10.3389/frai.2020.543405/full#B14))–is based on a Bayesian Network ([Koller and Friedman, 2009](https://www.frontiersin.org/articles/10.3389/frai.2020.543405/full#B12)) of primary care medicine, which models conditional dependencies between variables via a Directed Acyclic Graph (DAG).

Link: Babylon gives safer results than doctors. Compare this with any numbers AFF gave you (oops, they don’t have any)

[Adam Baker](https://www.frontiersin.org/people/u/928012), [Yura Perov](https://www.frontiersin.org/people/u/842098), Katherine Middleton, [Janie Baxter](https://www.frontiersin.org/people/u/966068), [Daniel Mullarkey](https://www.frontiersin.org/people/u/932145), Davinder Sangar, Mobasher Butt, Arnold DoRosario and [Saurabh Johri](https://www.frontiersin.org/people/u/1133875) 2020. (all except Rosario are with Babylon Health, London, UK. Rosario – is with Northeast Medical Group, Yale New Haven Health, USA) 30 Nov 2020 A Comparison of Artificial Intelligence and Human Doctors for the Purpose of Triage and Diagnosis (accessed 27 Nov 2021)

We compared the triage recommendations of doctors and the Babylon Triage and Diagnostic System against the judge’s “gold standard” range. We define a “safe” triage as any recommendation which was of equal or greater urgency than the judge’s minimum triage, and an “appropriate” triage as any recommendation that fell within the judge’s range of acceptable recommendations. In this study, we found that the Babylon Triage and Diagnostic System provided a safer triage recommendation than doctors on average (97.0% vs. 93.1%), at the expense of a marginally lower appropriateness (90.0% vs. 90.5%; see [Table 2](https://www.frontiersin.org/articles/10.3389/frai.2020.543405/full#T2)).

Link: Babylon is better because it avoids data bias

[Adam Baker](https://www.frontiersin.org/people/u/928012), [Yura Perov](https://www.frontiersin.org/people/u/842098), Katherine Middleton, [Janie Baxter](https://www.frontiersin.org/people/u/966068), [Daniel Mullarkey](https://www.frontiersin.org/people/u/932145), Davinder Sangar, Mobasher Butt, Arnold DoRosario and [Saurabh Johri](https://www.frontiersin.org/people/u/1133875) 2020. (all except Rosario are with Babylon Health, London, UK. Rosario – is with Northeast Medical Group, Yale New Haven Health, USA) 30 Nov 2020 A Comparison of Artificial Intelligence and Human Doctors for the Purpose of Triage and Diagnosis (accessed 27 Nov 2021)

Virtual assistants and medical AI technology in general have the potential to reduce costs and improve access to healthcare in resource-poor settings ([Guo and Li, 2018](https://www.frontiersin.org/articles/10.3389/frai.2020.543405/full#B9)). While such technologies may hold the promise of narrowing the gap in healthcare access between high and low income countries, great care must be taken to ensure that algorithms are fair and generalize to different subsets of the population. In particular, lack of diversity in medical datasets has the potential to result in biased algorithms which could widen healthcare inequality ([Nordling, 2019](https://www.frontiersin.org/articles/10.3389/frai.2020.543405/full%22%20%5Cl%20%22B17)). An advantage of Bayesian generative models such as the one used in this study is that it is less susceptible to such biases by incorporating robust epidemiological data for different regions rather than relying solely on datasets which may be biased toward a particular population. A further benefit of using a Bayesian network is that the model is interpretable, since the causal structure of the model allows cause and effect within the system to be observed and understood. This in turn makes the system explainable, which allows triage decisions from the model to be explained to the user in terms of the diseases and symptoms that gave rise to the recommendation. This allows the patient to make a more informed decision about whether to adhere to the advice of the system.

Impact: Better health care with Status Quo

Negative ballot keeps us on the path of using a better system, rather than switching to something unproven that we already know will not have the data sets that produce the best results.