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From ChatGPT to DeepSeek: Potential uses of artificial intelligence in early symptom recognition for stroke care

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In the era of artificial intelligence (AI), healthcare and medical sciences are inseparable from different AI technologies[1]. ChatGPT once shocked the medical field, but the latest AI model DeepSeek has recently taken the lead[2]. PubMed indexed publications on DeepSeek are evolving[3], but limited to editorials and news articles. In this Letter, we explore the use of DeepSeek in early symptoms recognition for stroke care. To the best of our knowledge, this is the first DeepSeek-related writing on stroke.

In 2023, our group published here a patient's experience of using ChatGPT to guide his early medical attendance[4]. With the availability of DeepSeek, the same set of questions were fed for response evaluation. DeepSeek's outputs are presented in Table 1. A step-by-step guide was yielded, the acronym of "FAST" in stroke management was mentioned. Towards the end, the responses of the chatbot were very humanized, even with a "blue heart" emoji, providing psychological care and comfort to the users. Similar to ChatGPT, DeepSeek is also a reliable tool for early symptom recognition.

DeepSeek, as an AI assistant, plays a supportive and educational role in pre-hospital stroke care. While it is not a substitute for professional medical care, it can contribute in symptom recognition, checklist tools, triage support, and more, to shorten time to treatment. For caregivers, DeepSeek also helps create clinical scenarios to maids and first responders to rehearse on what actions to take upon recognizing stroke patients. The checklist generated by DeepSeek includes 7 different categories: facial drooping, arm weakness, speech difficulty, sudden vision changes, balance or coordination issues, sudden severe headache, confusion or cognitive changes. Within each category there is a stem [e.g. Are you experiencing a sudden, severe headache with no known cause (like a 'thunderclap' headache)?] with 2 options: "Normal" versus "Concern". These question-and-answer-based checklists are quite user-friendly, and practical in the environment of emergency.

Simulation is an important pillar in medical education, particularly in team-based practice like emergency medicine[5]. To facilitate learning, debriefing *via* different methods after the simulations is essential for participants to gain and grow[5]. Concerning scenario-based simulation, we believe DeepSeek's performance was non-inferior to our traditional medical textbooks. DeepSeek also provides a post-simulation debriefing, with different levels of difficulties and learning objectives.

Here is one of the examples:

You're at home with your father. He suddenly slumps in his chair, drops his coffee cup, and says his words are 'coming out wrong.' What do you do next?

...

It's been 5 minutes since symptoms started. What do you do?

...

Post-simulation debrief

1. Key takeaways:

- FAST criteria (Face, Arms, Speech, Time).
- Importance of immediate action (time=brain cells saved).

2. Common mistakes:

- Waiting to see if symptoms improve.
- Transporting the patient without professional help.

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Table 1. Chat record with DeepSeek on 15th February, 2025. The acronym of “FAST” in stroke management was also mentioned by DeepSeek-R1.

Role	Chat record
User	I found that my left arm and legs are numb since this morning upon woke up, am I having a serious problem and shall I go to visit the Doctor?
AI	<p>If you're experiencing numbness in your left arm and legs that began suddenly and persists, it's important to take this seriously. While temporary numbness can occur from something benign like sleeping in an awkward position, persistent or sudden-onset numbness could signal a medical emergency, such as a stroke or transient ischemic attack (TIA). Here's what to do:</p> <p>Red Flags: Seek Emergency Care Immediately If You Have:</p> <ul style="list-style-type: none"> • Other stroke symptoms: <ul style="list-style-type: none"> o Facial drooping (especially on one side). o Arm weakness (e.g., difficulty lifting both arms evenly). o Speech difficulties (slurred or confused speech). o Time to call emergency services (e.g., 911) right away. • Sudden confusion, vision changes, dizziness, or loss of balance. • Severe headache or difficulty breathing. • Numbness that does not improve after moving/stretching. <p>Even Without Red Flags:</p> <ul style="list-style-type: none"> • See a doctor today if the numbness is persistent, unexplained, or worsening. Conditions like nerve compression, multiple sclerosis, or diabetes-related neuropathy require evaluation. • Risk factors (e.g., high blood pressure, diabetes, heart disease, smoking) increase urgency. <p>Next Steps:</p> <ol style="list-style-type: none"> 1. Call emergency services now if you have any stroke symptoms. 2. Visit urgent care/ER if numbness persists without improvement, even without other symptoms. 3. Monitor closely and avoid driving yourself if symptoms worsen. <p>Do not wait. Early intervention for conditions like stroke is critical. Better to err on the side of caution and seek professional evaluation promptly.</p>
User	You mentioned about the arm weakness, I feel that too! The power of my left arm and leg seems to be weaker than usual, should I go for the emergency department right away?
AI	<p>Yes, you should go to the emergency department (ED) or call emergency services (e.g., 911) immediately. Sudden-onset weakness in your left arm and leg, especially when combined with numbness, is a major red flag for a stroke or transient ischemic attack (TIA). These conditions require urgent medical evaluation, as every minute counts to prevent permanent damage.</p> <p>Why This Is Urgent:</p> <ul style="list-style-type: none"> • Stroke Symptoms: Weakness/numbness on one side of the body (arm/leg) is a hallmark sign of a stroke. Other symptoms may include: <ul style="list-style-type: none"> o Facial drooping (ask someone to check if your smile is uneven). o Slurred speech, confusion, or trouble understanding others. o Sudden vision changes, dizziness, or loss of balance. • Time Sensitivity: Treatments like clot-busting medications or procedures are most effective when given within hours of symptom onset. • TIA ("Mini-Stroke"): Even if symptoms improve, a TIA is a warning sign of an impending major stroke and still requires emergency care. <p>What to Do Right Now:</p> <ol style="list-style-type: none"> 1. Call 911 (or your local emergency number). Do not drive yourself—ambulance crews can begin life-saving care en route to the hospital. 2. Note the time when symptoms first started. This is critical for treatment decisions. 3. Stay upright/safe while waiting for help. Avoid eating/drinking in case swallowing is impaired. <p>Do Not Wait:</p> <ul style="list-style-type: none"> • Do not dismiss symptoms as "just fatigue" or a "pinched nerve." • Do not wait to see if symptoms improve on their own. <p>This is an emergency. Please act now—your quick response could save your life or prevent long-term disability.</p>
User	I am so worried and scared now. What will the ambulance man and doctors do for me?
AI	<p>It's completely normal to feel scared, but try to stay as calm as possible—you're doing the right thing by seeking help. Emergency responders and doctors are trained to act quickly and compassionately in situations like this. Here's what will likely happen:</p> <p>What the Ambulance Crew Will Do:</p> <ol style="list-style-type: none"> 1. Assess Your Symptoms: <ul style="list-style-type: none"> • They'll check your vital signs (blood pressure, heart rate, oxygen levels). • Ask about your symptoms, medical history, and when they started. • Perform a FAST test (Face drooping, Arm weakness, Speech difficulty, Time to act) to screen for stroke.

Table 1. Continued.

Role	Chat record
AI	<p>2. Immediate Care:</p> <ul style="list-style-type: none"> • May give you oxygen if needed. • Start an IV line to administer fluids or medications. • Perform a blood glucose test (low blood sugar can mimic stroke symptoms). <p>3. Rapid Transport:</p> <ul style="list-style-type: none"> • They'll alert the hospital so the stroke team is ready when you arrive. • Time is critical—they'll prioritize getting you to a hospital with a stroke center if possible. <p>What the Doctors in the ER Will Do:</p> <p>1. Urgent Imaging:</p> <ul style="list-style-type: none"> • CT scan or MRI of your brain to check for bleeding or a clot (key to determining if it's a stroke). • If a clot is found, they may administer clot-busting medication (like tPA) or perform a thrombectomy (procedure to remove the clot). <p>2. Blood Tests:</p> <ul style="list-style-type: none"> • Check for clotting disorders, infections, or metabolic issues (e.g., electrolyte imbalances). <p>3. Neurological Exam:</p> <ul style="list-style-type: none"> • Test your reflexes, coordination, vision, and strength to pinpoint the issue. <p>4. Monitoring and Stabilization:</p> <ul style="list-style-type: none"> • Monitor your heart (strokes can be linked to heart issues like atrial fibrillation). • Manage blood pressure or other vital signs if unstable. <p>5. Admission or Observation:</p> <ul style="list-style-type: none"> • If a stroke or TIA is confirmed, you'll likely be admitted to a stroke unit for monitoring and further treatment. • If symptoms resolve quickly (TIA), you'll still need urgent follow-up to prevent a future stroke. <p>What You Can Do Right Now:</p> <ul style="list-style-type: none"> • Stay calm: Focus on your breathing. Panic can worsen symptoms. • Don't delay: Even if symptoms ease, go to the ER. TIAs are warnings of a major stroke. • Inform someone: If you're alone, call a friend/family member to meet you at the hospital. <p>Reassurance:</p> <ul style="list-style-type: none"> • You're in good hands: Stroke protocols are well-established, and hospitals move quickly. • Many people recover: Early treatment greatly improves outcomes. <p>Please call 911 or your local emergency number NOW. Every minute matters, and the sooner you're evaluated, the better your chances of avoiding lasting harm. You've already taken the hardest step—reaching out for help. Let the professionals take care of the rest. (“Blue heart” emoji) Stay strong!</p>

3. Real-world stats:

- Patients who arrive at the hospital within hours of symptoms have better recovery rates.

In short, the role of chatbots in medical emergency pre-hospital care is evolving. DeepSeek is quite useful for early symptom recognition, as well as caregivers training.

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